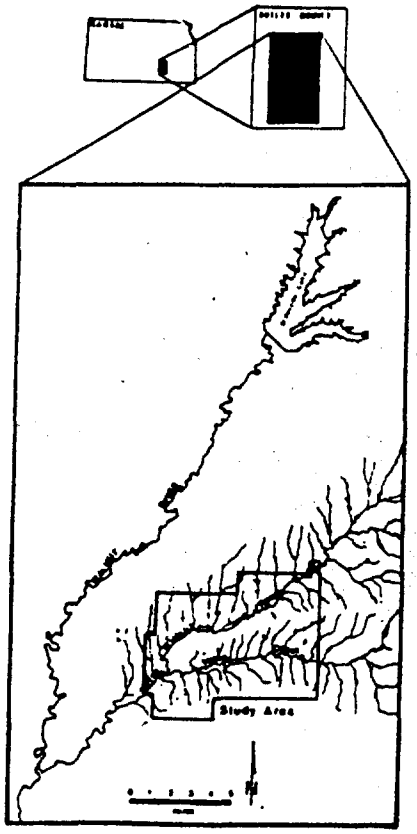
ARCHAEOLOGICAL SURVEY AT THE PROPOSED DOUGLASS LAKE BUTLER COUNTY, KANSAS 1987

Dorothy J. Gaston
Project Director



Donald O. Henry
Principle Investigator

Curt Sorenson
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Report to
U.S. Army Corps of Engineers
Tulsa District

University of Tulsa
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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF PLATES

ARCHAEOLOGICAL SURVEY
AT THE PROPOSED DOUGLASS LAKE
BUTLER COUNTY, KANSAS
1987

INTRODUCTION

The project area is composed of all elevations below 1300 feet asml on the Little Walnut River and Hickory Creek above the proposed dam site (figures 1 and 2). The proposed dam location lies on an approximately WNW to ESE axis from the NE/4, NW/4 of Section 13, T28S, R4E to the SE/4, SW/4 of Section 20, T28S, R5E in Butler County, Kansas. The floodpool would extend northeastward to Leon on the Little Walnut River (SE/4, SE/4 of Section 21, T27S, R6E) and to the NE/4, NW/4 of Section 15, T28S, R6E along Hickory Creek.

The purpose of this study is to build a predictive model for use in approximating the probable locations, numbers, and likely mitigation needs of sites to be encountered should the lake be built. To this end, a brief soil geomorphology study, together with a pedestrian archaeological survey of a selected areal sample have been completed. Data derived from this work, as well as that from prior area surveys, have been utilized to build such a model. Additionally, a brief study of a local historic site was undertaken, and both historic and prehistoric sites reported.

Prior surveys in the area have been conducted primarily in relation to replacement of bridges across the two waterways (e.g. Rohn 1980). An older effort to record sites known to local collectors provided additional data (Reynolds 1973). Although a four-lane highway has recently been put through the area (ca. 1982), reports relating to this are not available.

Major studies undertaken nearby include those for El Dorado Lake (Adair 1979; Brockington 1982; Eoff and Johnson 1968; Fulmer 1976; Johnson 1983; Leaf 1979; Root 1979). Studies of similar physiographic areas include those undertaken on the upper Salt Creek and Beaver Creek in Kay County, Oklahoma (Vehik 1982) and near Shidler, Oklahoma (Kirby and Justen 1983). Data from these studies were considered in selecting areas to be surveyed during the present study.

PHYSICAL SETTING

The study area lies in the Flint Hills Upland of the Central Plain. Frye and Leonard (1951:205:206) describe the hills as "...a series of prominent cuesta scarps and dip slopes developed on cherty limestones of Permian age (primarily Wreford, Florence, Fort Riley, and Herrington).... Where the dip slope upland is well developed....it is extensively veneered with angular residual chert derived from the underlying Florence limestone .."

Climatologically, the area lies in a continental weather zone, with average winter rainfall of 5 inches, average summer rainfall of 12-13 inches, and average winter snowfall of about 15 inches. While winter precipitation varies slightly, the variation in summer precipitation from year to year is great (Borchert 1950). Average daily temperatures range from 32°F. in January to 80.3°F. in July (Penner et al. 1975). The temperature extremes recorded between 1903 and 1960 range from -28°F. to 117°F. (Penner et al. 1975:58). This weather pattern is a primary factor in the development of prairie, as opposed to forest. Trees are far more sensitive to variation in summer precipitation than are grasses.

The area lies in the tall-grass prairie biome, and this is certainly descriptive of the uplands. Treed or forested areas line the banks of major waterways, and depending on the perm-

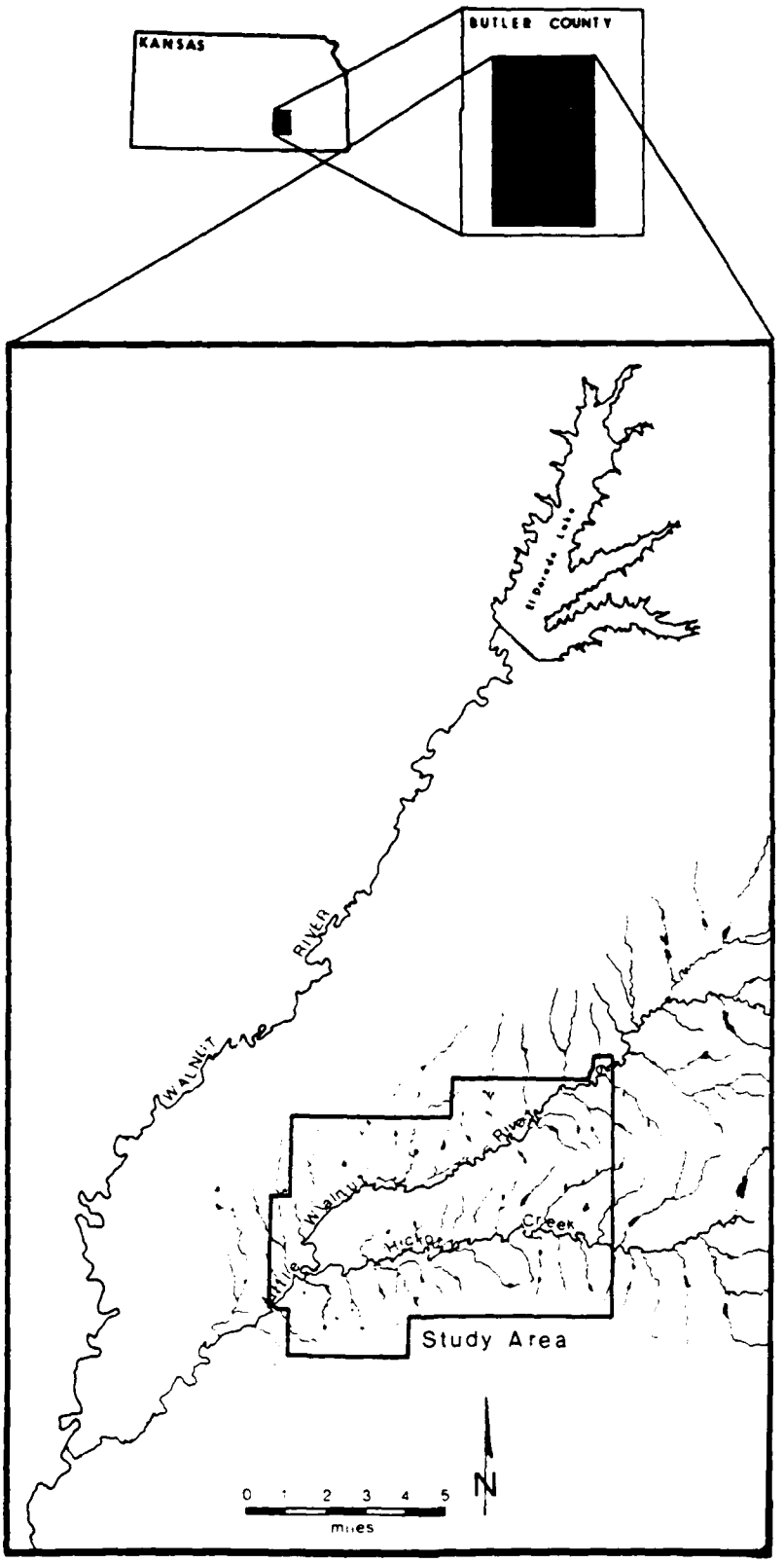

Figure 1. Location of the Study Area.

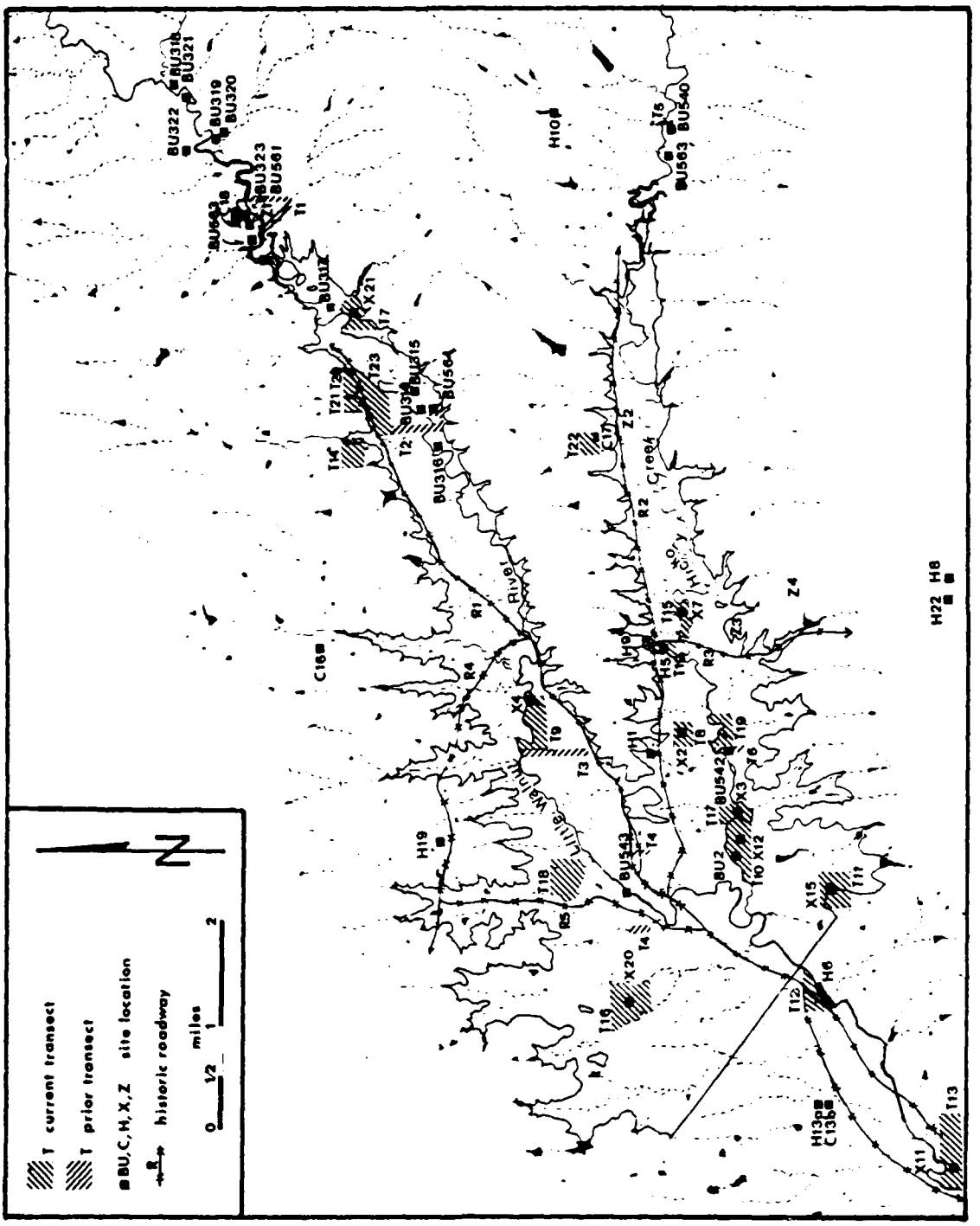

Figure 2. Sites and Transects in the Study Area.

anence of the water source, along some of the minor tributaries, as well. Although this riverine forest is primarily of the cottonwood-elm-willow association, oak, hickory, walnut, and Osage orange are also present. Although it is likely that the forest cover expanded and receded elevationally in concert with fluxes in precipitation, the modern soils of the area shown no evidence of formation under forest.

SOILS

In describing the upland soils, Frye and Leonard (1951:207) state that "The A horizon is commonly only a few inches thick, but in our judegment as much as 3 to 6 feet of angular chert in a matrix of red clay may properly be regarded as the B horizon. This material grades downward into partly weathered limestone that retains clear evidence of stratification."

By contrast, however, Drew (1981: 12-15) reports that within the El Dorado Lake project area "the upland regolith is generally a comparatively thin veneer, ranging from literally nothing to 1.5-2.5 m. in places.... there is a sharp break between bedrock and regolith. Weathered transitional zones between the two have not been detected."

He further indicates that the nature of the silt (subangular quartz) suggests that the regolith is of aeolian origin, with deposition occurring approximately 20000 B.P. Penner et al. (1975) suggest a loess component, but do not define it.

Drew (1981) describes a transitional zone between the upland and floodplain soils developed on mixed colluvial and alluvial deposits of clays, silts, and gravels. He indicates fill terraces of red alluvium, as well as red-brown to brown alluvium. He dates the red alluvial fill to about 18000 B.P., with the browner deposits related to more weathered surfaces of the upland regolith.

The present study suggests that the situation in the Little Walnut River and Hickory Creek drainages is somewhat more complex. There are color gradations in both upland and lowland soils that indicate multiple erosion alluviation and loess deposition events.

Field work included examination of soil cores in several locations to determine the local characteristics of the soils. These locations are listed in Appendix A, Table I.

Appendix A, Table II lists the soils and their characteristics. In addition to the listed materials, all those defined as "silty" or "silt" have some quantity of loess. Table 1 presents the soils grouped by color and material composition. These groupings suggest that the transitional and lowland soils derive from differing erosional episodes, between horizons in some instances. Figure 3 indicates the positional relationships between soils in a typical valley cross section, while figure 4 indicates the position of cut and fill terraces.

The following sequence of soil development is suggested, subject to further field and laboratory analyses:

1. Formation of the basal levels (2.5YR chroma) of Florence, Olpe, Ladysmith, and Clime soils from original loess deposition and weathering of limestone bedrock.

2. Development of A horizons on these surfaces, possibly with additional loess deposition, resulting in coloration in the 5YR chroma. If additional loess deposition is posited, then Irwin and Labette soils probably also developed in situ.

3. Severe erosion of all surfaces, resulting in valley scouring and deposition of the Norge alluvium as the primary valley fill.

4. Additional loess deposition and limestone weathering resulting in development of the Dwight soils (7.5YR chroma), and redevelopment of A horizons on the older upland soils.

Table 1. Soils Grouped by Color and Material

Name	Horizon	Munsell	Composition
Florence	B21t	2.5YR3/4	coarse clay
Florence	B22t	2.5YR3/4	coarse clay
Olpe	B21	2.5YR3/6	chert gravel
Ladysmith	C2	2.5YR3/6	clay
Olpe	B22t	2.5YR4/6	clay
Clime	AC	2.5YR5/3	silty clay
Florence	B1	5YR3/3	silty clay
Olpe	B1	5YR4/2	silty clay loam, heavy
Norge	B1	5YR4/3	silty clay loam
Irwin	C2	5YR4/4	silty clay
Irwin	C1	5YR4/4	silty clay
Norge	B21t	5YR4/5	silty clay loam
Ladysmith	C1	5YR4/6	silty clay, light
Labette	B3	5YR4/6	silty clay, heavy
Labette	B2t	5YR4/6	silty clay, light
Tully	B3	5YR5/2	silty clay
Norge	B22t	5YR5/5	silty clay loam, heavy
Norge	B32	5YR5/6	silty clay loam
Norge	B31	5YR5/6	silty clay loam, heavy
Clime	C	5YR6/3	silty clay
Labette	B1	7.5YR3/2	silty clay,light
Dwight	B3	7.5YR3/2	silty clay
Olpe	A1	7.5YR3/2	silty clay loam
Norge	A1	7.5YR4/2	silty loam, heavy
Tully	B21t	7.5YR4/3	silty clay
Dwight	B3	7.5YR4/3	silty clay
Dwight	B22t	7.5YR4/3	silty clay
Vanoss	B2t	7.5YR5/3	silty clay loam
Irwin	B3	7.5YR5/4	silty clay
Vanoss	B3	7.5YR5/4	silty clay loam, light
Clime	A1	10YR3/1	silty clay
Brewer	B1	10YR3/1	silty clay loam, heavy
Sogn	A1	10YR3/1	silty clay loam, light
Tully	A1	10YR3/1	silty clay loam
Florence	A1	10YR3/1	silt loam
Ladysmith	B21t	10YR3/2	silty clay
Verdigris	AC	10YR3/2	silty clay loam
Brewer	B2t	10YR4/1	silty clay
Brewer	C	10YR4/1	silty clay
Verdigris	A11	10YR4/1	silty clay loam
Verdigris	A12	10YR4/1	silty clay loam
Brewer	A1	10YR4/1	silty clay loam
Ladysmith	A1	10YR4/1	silty clay loam, light
Vanoss	A1	10YR4/1	silt loam
Dwight	A1	10YR4/1	silt loam
Ladysmith	B22t	10YR4/2	silty clay
Irwin	B22t	10YR4/2	silty clay
Labette	A1	10YR4/2	silty clay, light
Irwin	B21t	10YR4/2	silty clay loam
Vanoss	B1	10YR4/2	silty clay loam
Tully	B1	10YR4/2	silty clay loam, heavy
Irwin	A1	10YR4/2	silty clay loam
Verdigris	Ap	10YR4/2	silt loam
Tully	B22t	10YR5/3	silty clay
Olpe	B3	10YR6/3	chert gravel
Ladysmith	B3	10YR6/3	silty clay, light

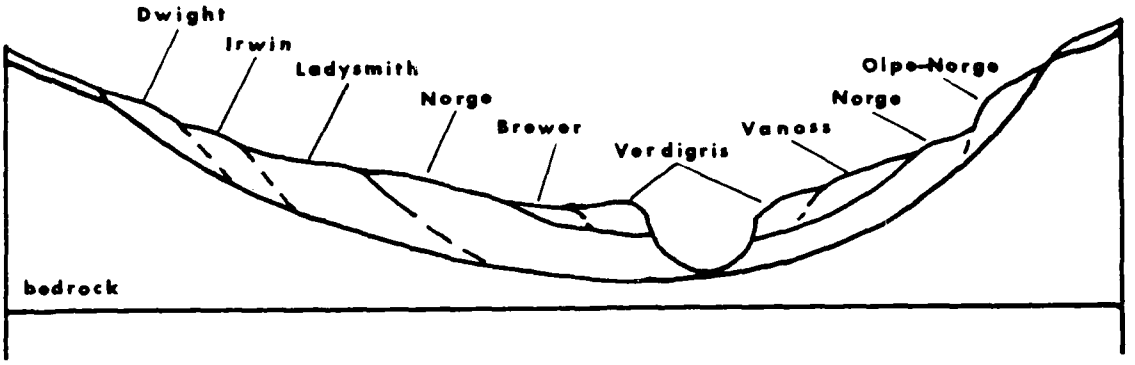

Figure 3. Positional Relationships of Soils in Typical Valley Cross Section

5. Erosion of the uplands and resulting terrace fill with the Vanoss soils. These terraces may vary in age. Such a terrace was dated from at least 5000 B.P. at the Snyder site at El Dorado Lake (Haury and Leaf 1982:255).

6. Redevlopment of strongly organic A horizons on all soil surfaces (10YR chroma), possibly including more loess deposition.

7. Erosion of all area A horizons in the modern ear (post ca. 2000 B.P.) resulted in deposition of the Verdigris and Brewer soils.

Given a date of 18000 B.P. for the Norge deposition, an age of about 12000 B.P. suggests itself for the Dwight soil development.

The evolution of the modern alluvial deposits of the Verdigris and Brewer soils probably results from multiple downcutting and realluviation episodes. Creekbanks indicate this is several locations (Plates 1 and 2). Long term residents report that, prior to cessation of deep plowing techniques in the 1960s, it was not unusual for a field to lose its entire plowzone in one erosional episode. The floods of the early 1940s are reported to have removed as much as three feet of soil from some locations.

Given the above considerations, the following suggestions for archaeological site locations may be made. In general, sites located on the upland may be of any age, but are likely to be deflated. Older materials, in particular, should be suspected of vertical displacement. Sites are unlikely to be buried within the Norge valley fill due to its antiquity. Modern erosion suggests that surface sites on Norge soils are likely to be deflated, as well. The Vanoss terrace soils may be important locations for buried sites, as may the Verdigris and Brewer soils. Prehistoric workshops could be associated with the Olpe-Norge gravels.

In all alluvial locations, it is important to define living surfaces before designating cultural deposits as in situ. All soils in the area may contain significant amounts of angular colluvial or subangular gravelly cherts via natural processes, even when not part of the listed soil characteristics. It is essential to define culturally modified cherts and/or other cultural materials at a location before defining it as an archaeological site.

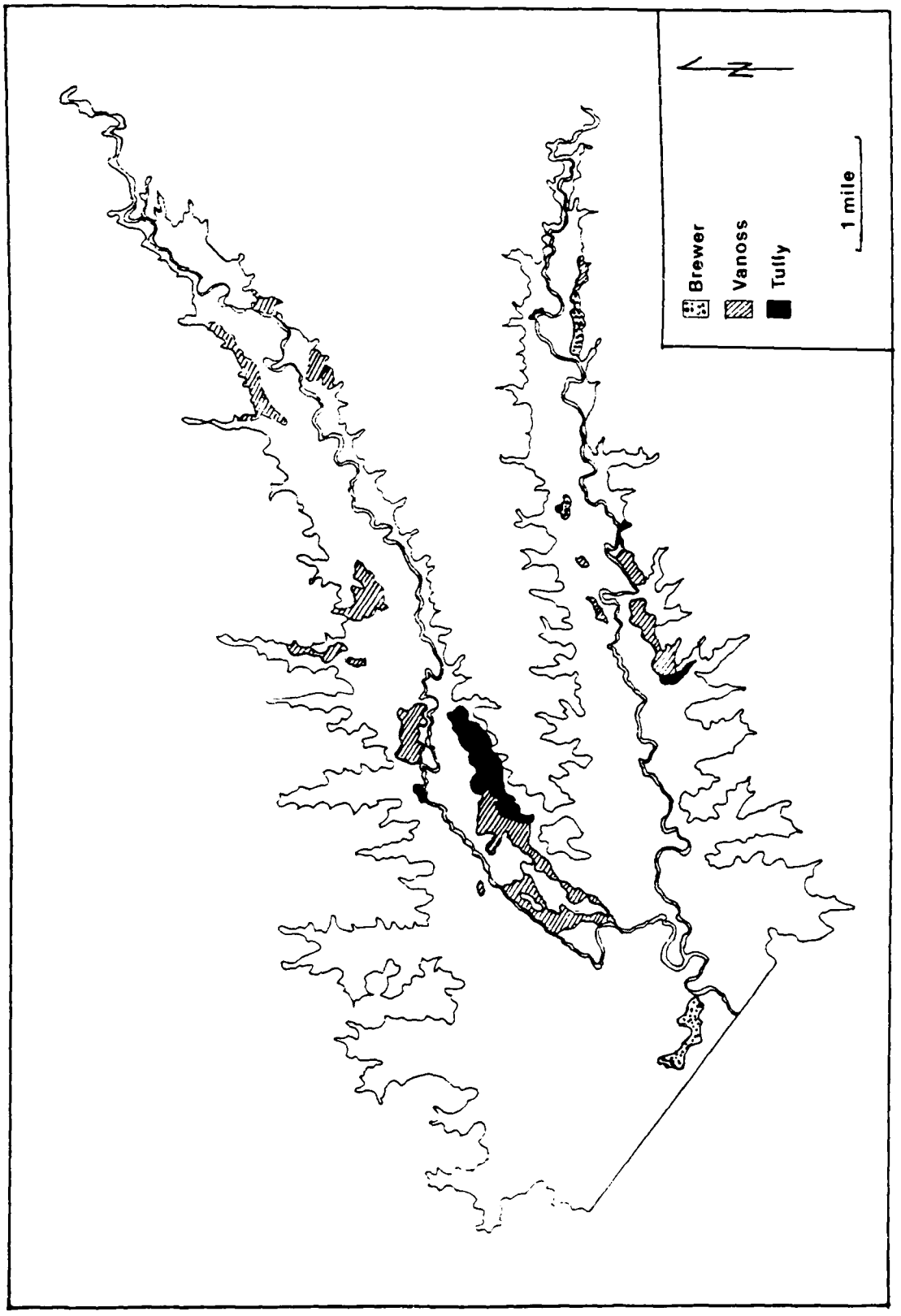

Figure 4. Locations of Cut and Fill Terraces in the Study Area.

Plate 1. Cutbank on Hickory Creek.

Plate 2. Cutbank of the Little Walnut River.

RESOURCES

The biotic resources of the project area rest along linear elevational belts that parallel the two major streams. The streams provided habitats for fish, mussels, turtles, and waterfowl, while the lower wooded regions supported squirrels, rabbits, raccoons, and wild turkeys. At higher elevations, the forest edges attracted deer, elk, and quail while the uplands supported bison, prairie chickens, and jackrabbits.

Nut mast was available, but not plentiful, in the wooded areas, which also provided roots, tubers, and assorted berries and greens. Chenopodia and similar grassy seeds were abundantly available on the uplands. Bois d'arc (bowwood or Osage orange) is listed by the Soil Conservation Survey as a local "weed tree" (Penner et al. 1975) and can be observed in every hedgerow at present. A few areas appear to be swampy enough for reeds, but these are not now in natural vegetation.

Water resources, in addition to the Little Walnut River and Hickory Creek, were provided by springs outwelling at the edge of the upland caprock. The uplands themselves, however, had few water resources.

Haury (1984), reviewed the chert resources of the area in detail and found several major sources. Cherts are plentiful, but of varying quality. The upland caprock is the Florence B formation, providing a good quality chert. The Olpe-Norge soils represent Cenozoic chert gravel deposits, with gravels of sufficient size to be useful both as hammerstones and as raw material for chipped stone tools. The source of Florence C chert is uncertain, but it may be derived from these gravels. The Herrington formations at the western end of the study area (under Dwight soils) also provided a source of chert. Figure 5 indicates the locations of these resources as defined by Haury (1984).

CULTURAL CHRONOLOGY

The cultural chronology of the area may be divided into several major blocks, each of which may have several subdivisions. Where phases have been identified in the area, these are noted in the descriptions below.

Paleoindian (ca. 10000-6000 B.C.)

Sites from this period are most frequently isolated finds of the characterisitic bifacially worked, large fluted points such as Clovis. Occasional sites include Pleistocene fauna such as mammoth or bison equus. Even less frequently, a residential site has been located (cf. Lindenmeier in Cassells 1983:51). No sites of this age have been reported for the study area. The erosional/ depositional sequence in this drainage system (see Soils above) makes the potential for finding sites of this period very low.

Archaic (ca. 6000 B.C. to A.D. 1)

This period is marked by both diachronic and synchronic variability in artifact style and function throughout the riverine midwest. In general, however, these variations apear to be local variations on the general theme of hunting the largest availabe game combined with opportunistic small game hunting and gathering. Horticulture involving native North American cultigens such as sunflower, sumpweed, gourds, and possibly giant ragweed appears to have developed during the Archaic.

Local variations identified by phase designations include Chelsea (ca. 4600-3950 B.P.), El Dorado (3950-3100 B.P.), and Walnut (3100-1950 B.P.) at El Dorado Lake (Parisi 1983:4). Some confusion exists in the literature as to whether Walnut Phase is Archaic or Woodland. It probably reflects a trans-

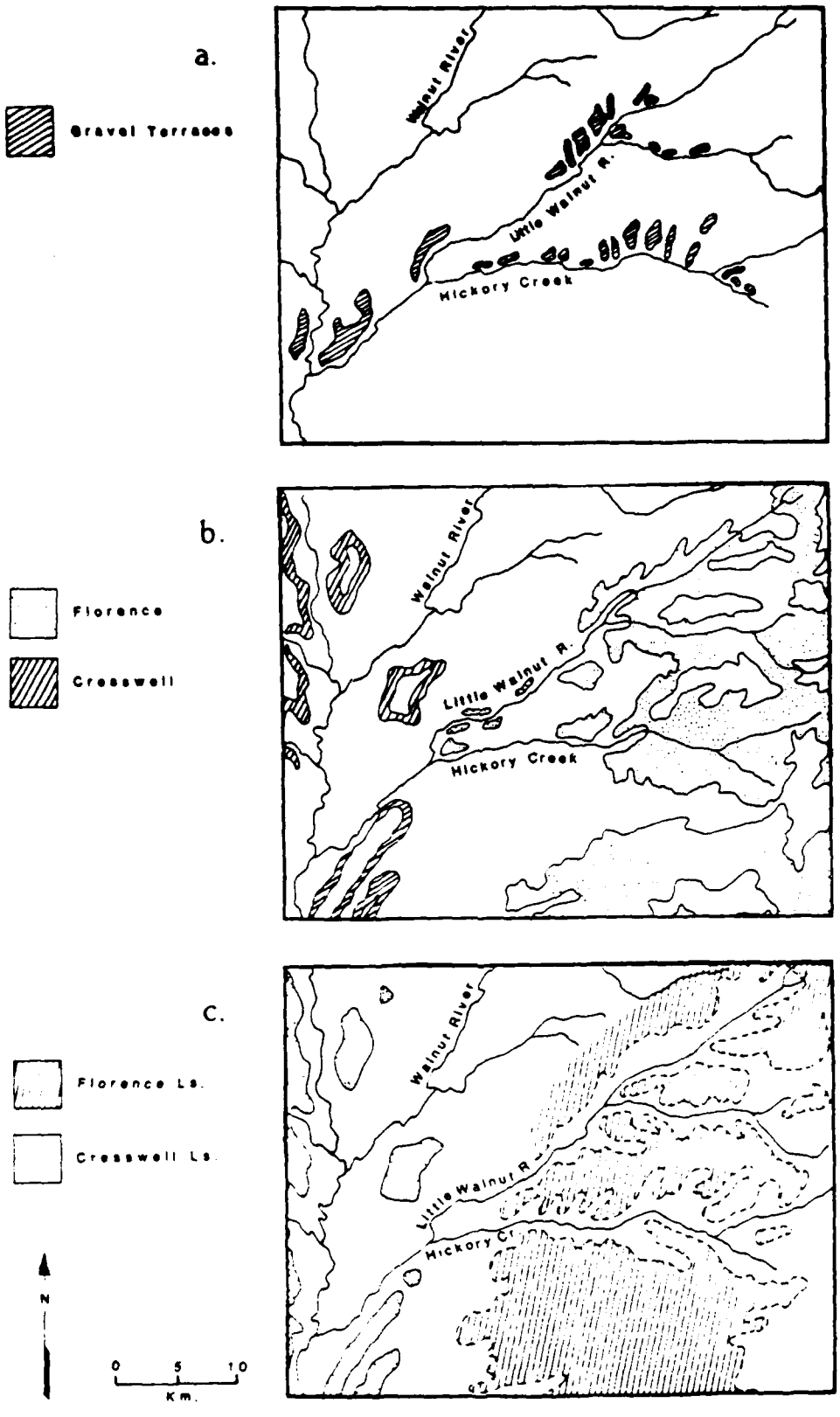

Figure 6. Chert Resources in the Study Area (Haury 1983). a) Gravel terraces, b) residual cherts, c) bedrock.

itional period (Leaf 1979). These phases commonly include large projectile points, bifaces which may have served as knives and/or spear points, and formally retouched scrapers. Variations in style may be related to variation in hunting strategies generated by differences in the available game (Leaf 1979:11).

Woodland (ca. A.D. 1 to 1000)

This period is marked by the introduction of ceramics, maize horticulture, and small projectile points such as Sequoyah and Scallorn throughout the greater riverine midwest. Residences appear to have been oval wattle and daub structures.

The first half of this period (A.D. 1-500) is very poorly represented in the general area. This has been identified as a dryer than usual period in the Walnut and Verdigris drainages (Artz 1983; Artz and Reid 1984; Haury 1984). This may have resulted in a less extensive human use of the area than in earlier or later periods, and it certainly led to very poor site preservation due to heavy erosion.

Links to both Kansas City Hopewell and Harlan Phase Caddoan have been suggested for the latter half of this period (ca. A.D. 500-1000; Parisi 1983). Situated more or less midway between these two cultures, it is likely that the study area saw fluctuations in dominance or influence between the two cultures.

Plains Village (ca. A.D. 1000 to 1700)

Although the transition from Woodland to Plains Village is poorly defined, the resultant cultures have been linked to protohistoric and historic Caddoan speakers by both archaeologists and ethnologists (Susan Vehik, personal communication 1987; Garrick E. Bailey, personal communication 1987). Lithics, ceramics, and general characteristics of these sites differ from those of other Caddoan cultures only to the extent justifiable by environmental differences. They share such attributes as shell-tempered ceramics, small arrow points, and exotic shell ornaments. As a further basis for this link, it has been shown that cherts from within this area, most particularly Florence A, are distributed in sites throughout the Caddoan area in high frequency (Vehik, personal communication 1987). The most likely historic candidates for this group in this area are the Wichita.

Residence sites of this period are larger and more complex than earlier sites, and reflect semi-permanent to permanent residences. They are located near horticultural fields. It is likely that they were occupied on a permanent basis except for absences during the summer bison hunting and fall deer hunting/nutting periods. The pressures of Siouans from the north, Shoshoneans from the west, and the Osage from the east may have been the cause for abandonment of the area by the Plains Village cultures ca. A.D. 1700. This is evidenced by the relocation of the Wichita into Texas at about this time.

Historic Indian (ca. A.D. 1700 to 1867)

The area came under the influence of the Osage during their expansion at about A.D. 1700 (figure 6; Weigers 1985). It was formally made Osage reservation in A.D. 1825 (figure 7). The Osage resold it to the federal government in 1867 and removed to Osage County, Oklahoma. The locations of the permanent Osage villages were primarily to the east in the Verdigris River drainage (Burns 1985), but an Osage "hunting trail" passed just north of the study area (figure 7). Historic Osage sites primarily feature European goods (gun parts, ceramics, metal pots, etc.). They may be distinguished from their contemporary European counterparts by the presence of large ovoid chert scrapers, by gunflints made on local cherts (rather than French chert), and possibly by metal projectile points. At Claremore's Village in Rogers County, Oklahoma (occupied ca. A.D. 1836), several musket barrel sec-

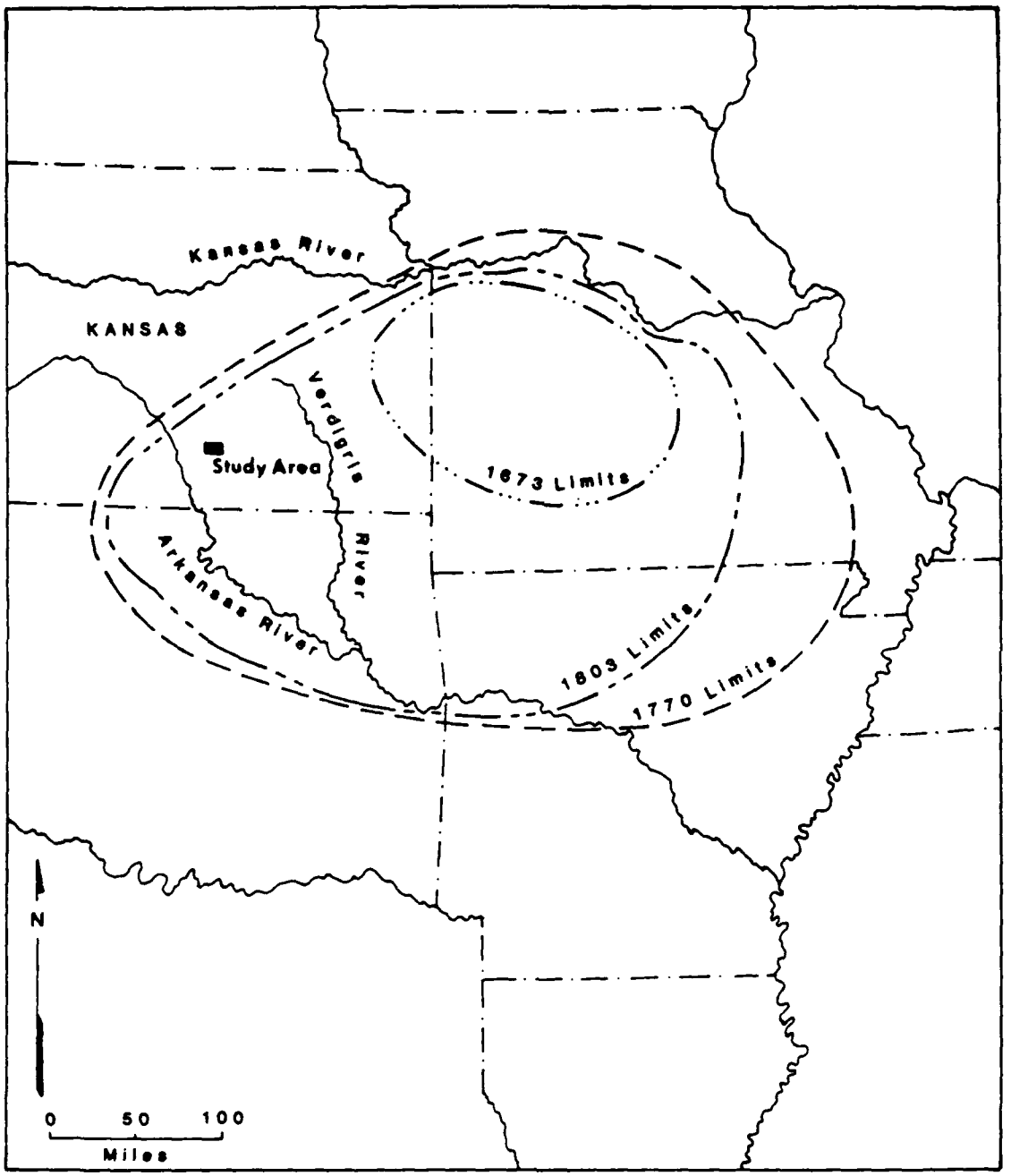

Figure 6. Osage Expansion (Bailey 1973)

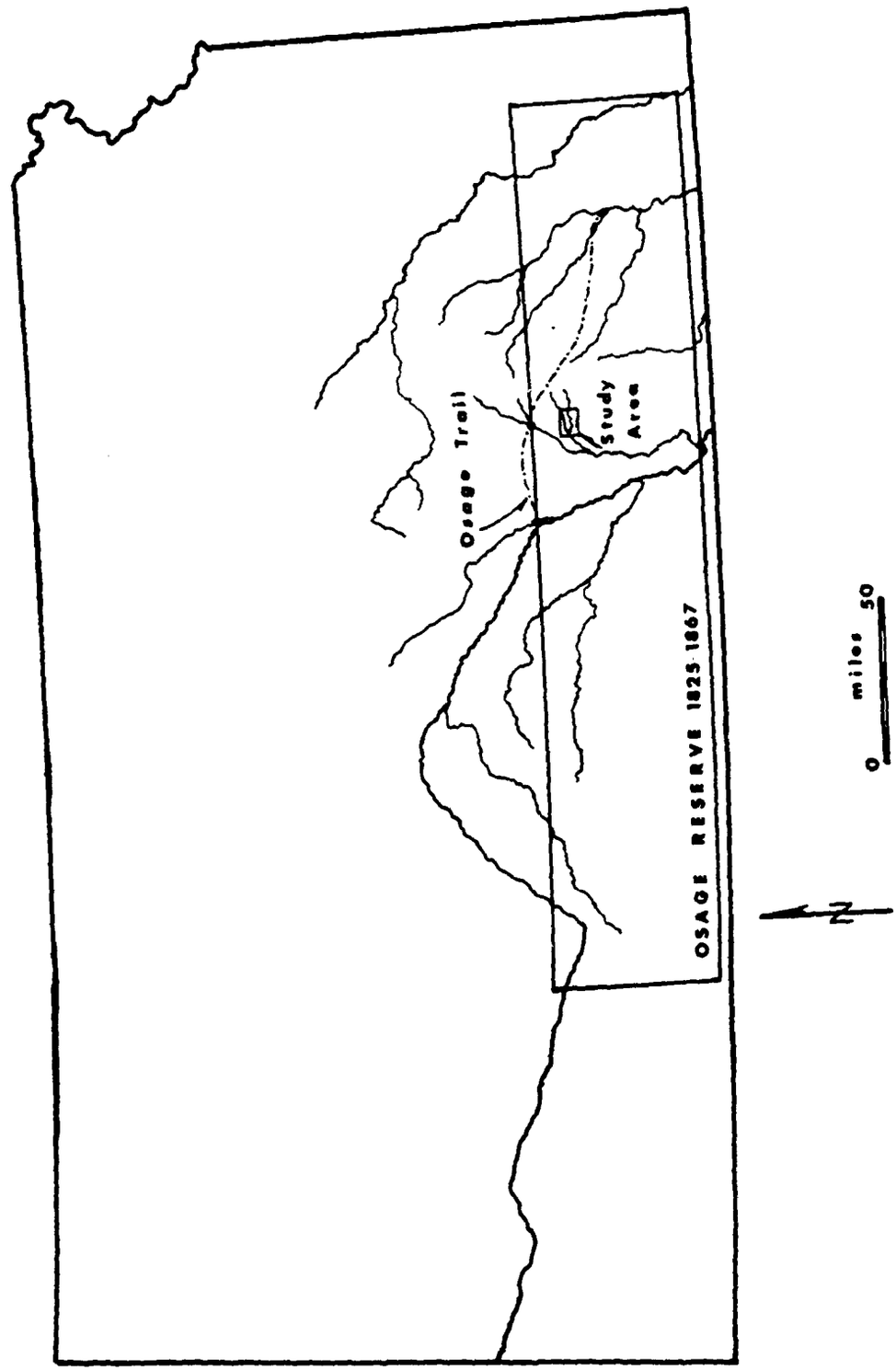

Figure 7. Osage Reservation and Hunting Trail

tions with battering on one or both ends were recovered (Lees 1975). Uses suggested for these include tent stakes and sugar maple taps. Neither can presently be adequately demonstrated.

Some Wichita returned to the area during the Civil War and settled in the Osage Reservation (Burns 1985). Although the specific locations have not been identified, the study area lies within their earlier traditional homeland, seems not to have been heavily occupied by the Osage, and would have been a logical location. During this time, Wichita settlements would have had attributes much like the contemporary Osage.

One site, 14BU318, which combined lithic artifacts and musket balls probably dates to early within the historic Indian occupation of the area.

Historic European Occupation

Although portions of Butler County were available for white settlement prior to 1867, the study area itself was officially closed until that time. White settlement immediately followed federal acquisition of the Osage Reservation in 1867, with land ownership granted by federal patent. The majority of the new residents engaged in cattle ranching, although a variety of tradesmen also located in the area. Mills were established at Leon and Bois d'Arc. A blacksmith located at Bloomington. Many of the new residents, including a stonemason, were of Swedish derivation. The five graveyards examined each include a number of graves dating between 1867 and 1875. The numbers, compared to those of recent burials, suggest that either a large number of people arrived, or that mortality was high.

A Pony Express Station, later Freedom Post Office, was located on the road following Hickory Creek (see figure 2). Schools and churches were established at Little Walnut (now Leon), Webster (now Webster Church), and Bloomington.

The earliest structures were, forthe most part, log cabins, with lumber for more elegant structures imported from Coffeeville. Brick was imported from Missouri. Local native limestone was utilized in some structures. Local historians report that many settlers originally built on the lower floodplain, but very quickly removed to higher ground. The "second generation" of structures were substantial two story Victorian farmhouses. Many of these remain standing today (See Appendix C).

The following years saw the establishment of dirt farms on the bottomlands and valley flanks. The uplands, however, remained primarily "cattle country". Local legend places a band of horsethieves on the south side of Hickory Creek early in this period. The grave described as washing out of the bank of Hickory Creek was that of one of these individuals.

The discovery of the several major oil fields generated a population boom in the early twentieth century. At least one "boom town" was established (Magna), and the other small communities temporarily expanded. Once these fields were well established, however, the population declined significantly, with most of the smaller centers essentially defunct by the early 1940s. The major floods of 1943 and 1944 generated hardship for many of the farmers and the businesses who served them, speeding population decline. Many of the old farmhouses are now occupied by commuters from Wichita or El Dorado.

METHODOLOGY

The first stage of the survey, the geomorphological study, sampled the major soils on or near previously identified archaeological sites. Cores were examined to determine the color and general composition of the subsurface

horizons. The data from this stage were utilized in forming a strategy for the pedestrian archaeological survey.

Several criteria were used in selecting areas for the archaeological survey. (1) Each of the major floodplain and valley flank soils were to be represented. (2) Each of the general topographic regions (floodplain, valley flank, upland) were to be sampled. (3) Minor tributaries as well as the major waterways were to be sampled. (4) In an effort to offset the biases of the earlier surveys, broader areas in each domain were to be sampled. (5) Selected areas were to afford maximum exposure of the soil where possible.

The soils represented in the survey included Verdigris, Vanoss, Brewer, Irwin, Norge, and Dwight. No less than 40 acres were examined in each transect. Transect locations are indicated on figure 2 and are described in table 2.

Following completion of the survey, the data were analyzed in terms of artifact density per square meter within sites, and site density per square kilometer of survey area. This data incorporated both information from the current survey and from previous surveys. Randomly reported sites which were not encountered in the course of formal survey were not included in the site density data, but were included, where information was adequate, in the artifact density data. Recommendations from site reports, both previously and currently reported, were utilized to determine the percentage of sites likely to require mitigation.

A secondary survey goal, to identify and record historic sites, was incorporated into the survey in several distinct ways. First, those sites of those structures reported on old maps and/or in the historic literature were searched out while moving from place to place during both the gemorphological and archaeological surveys. In the case of historic roadways, three survey transects included areas where roads were indicated on the GLO (1867) maps. In addition, where these old roads would have crossed the modern roads, an attempt was made to locate them. Specific historic sites were examined and interviews with present owners conducted where possible. Cemeteries were visited to determine whether or not they may have incorporated earlier Indian burials. Two former community centers were visited. Two additional "historic sites", one noted on the GLO maps as remnants of an Indian Village, the other as an Old Indian Field were also incorporated into the survey.

Following personal observation of the site by the Corps of Engineers contact, a more intensive examination of Bois d'Arc was undertaken.

SURVEY RESULTS

The initial impression given by the survey crew sas "chert, chert everywhere, but not a tool in sight!" This impression continued to be held throughout most of the survey. Interviews with local landowners quickly revealed a portion of the problem. Those who had collected on their own land over the years reported that materials turned up on the surface only with deep plowing, a technique that was abandoned more than twenty years ago. In only one instance was a site reported by landowners on the surface of the floodplain, and that one may have dated, at least in part, to the historic period. Where landowners were specific in their location of the sites and the materials collected from them, the information has been incorporated into the survey results.

A total of 15 transects were walked, totalling 845 acres (figure 2, table 2). A total of nine previously unreported prehistoric sites were located, to bring the total within the study area to 27. Twenty one historic structures or cemeteries were located and record-

Table 2. Transects Surveyed

Trans. #	Prior/ New	Location: ¼	¼	¼	Sec.	TS	RE	Elevation: Min.	Max.	Soil Association	Drain.	Transect Size	Physio. Location	# Sites
T-01	P	N½	NW	NW	28	27	6	1290	1310	Norge	LW	0.080937	valleyflank	0
			SW	NW	28	27	6	1300	1320	Verdigris	LW	0.056656	floodplain	0
			E	NE	29	27	6	1290	1310	Norge	LW	0.040469	valleyflank	1
T-02	P		S	SW	31	27	6	1280	1300	Verdigris	LW	0.031363	terrace	1
		W½	NW	SW	31	27	6	1280	1300	Verdigris	LW	0.010117	terrace	0
		W½	SE	NW	31	27	6	1280	1300	Verdigris	LW	0.005006	terrace	0
T-03	P	E½	SE	SE	4	28	5	1260	1280	Verdigris	LW	0.010117	terrace	0
		SW	NE	SE	4	28	5	1260	1280	Norge	LW	0.005059	valleyflank	0
		E½	NE	NE	9	28	5	1260	1280	Verdigris	LW	0.010117	terrace	0
		NE	SE	NE	9	28	5	1260	1280	Labette	LW	0.005059	valleyflank	0
T-04	P	E½	SE	SE	8	28	5	1270	1280	Brewer	LW	0.025146	floodplain	0
		E½	SW	SE	8	28	5	1240	1250	Verdigris	LW	0.025146	floodplain	0
T-05	P	E½	NE	NE	16	28	6	1300	1310	Verdigris	HC	0.010117	terrace	0
			SE	NE	16	28	6	1300	1310	Verdigris	HC	0.080937	terrace	1
		N½	SW	NE	16	28	6	1300	1310	Verdigris	HC	0.064750	terrace	1
T-06	P	E½	NE	SE	16	28	5	1240	1260	Verdigris	HC	0.007588	terrace	1
		E½	SE	SE	16	28	5	1240	1260	Verdigris	HC	0.007588	terrace	0
T-07	N		NW	NW	32	27	6	1280	1310	Verdigris	LW	0.161874	terrace	1
			NE	NW	32	27	6	1280	1310	Brewer	LW	0.101171	floodplain	0
		W½	NE	NW	32	27	6	1280	1310	Verdigris	LW	0.006745	terrace	0
T-08	N		SW	NW	15	28	5	1260	1300	Irwin	HC	0.161874	valleyflank	1
		E½	SE	NW	15	28	5	1260	1300	Norge	HC	0.010117	valleyflank	0
T-09	N		SE	SW	3	28	5	1260	1280	Verdigris	LW	0.161874	terrace	1
			SW	SW	3	28	5	1260	1280	Verdigris	LW	0.161874	terrace	0
T-10	N		SE	SE	17	28	5	1230	1260	Verdigris	HC	0.121406	floodplain	1
			SW	SW	16	28	5	1230	1260	Verdigris	HC	0.161874	floodplain	0
T-11	N		NW	SE	20	28	5	1280	1300	Clime/Sogn	HC	0.161874	upland	0
			SW	SE	20	28	5	1280	1300	Dwight/Irwin	HC	0.161874	upland	0
T-12	N		NW	SE	19	28	5	1200	1220	Verdigris	LW	0.121406	floodplain	0
		NW	NE	SE	19	28	5	1200	1210	Verdigris	LW	0.040469	floodplain	0
T-13	N	S½	SE	SE	26	28	4	1200	1220	Verdigris	LW	0.048562	terrace	1
			S½	SW	25	28	4	1200	1220	Verdigris	LW	0.323749	terrace	0
T-14	N		NE	NE	36	27	5	1280	1340	Olpe-Norge	LW	0.161874	tributary	0
T-15	N	N½	SW	NW	14	28	5	1240	1260	Norge	HC	0.080937	valleyflank	0
		NW	SE	NW	14	28	5	1240	1260	Verdigris	HC	0.040469	terrace	1
T-16	N	SE	NW	SW	7	28	5	1280	1300	Irwin/Ladys.	LW	0.161874	tributary	1
T-17	N	SW	NE	SW	16	28	5	1230	1250	Verdigris	HC	0.040469	floodplain	0
			SE	SW	16	28	5	1230	1250	Verdigris	HC	0.040469	terrace	1
T-18	N		NW	NE	7	28	5	1250	1270	Irwin	LW	0.161874	valleyflank	0
			NE	NE	7	28	5	1250	1270	Irwin	LW	0.161874	valleyflank	1
T-19	N		SW	NW	15	28	5	1290	1300	Irwin/Norge	HC	0.121406	terrace	1
T-20	N		NW	NE	31	28	6	1290	1310	Vanoss/O-N	LW	0.053958	terrace	0
T-21	N		SW	NW	31	28	6	1290	1310	Vanoss	LW	0.026979	terrace	0
T-22	N		SE	NE	12	28	5	1300	1320	Dwight/Flor.	HC	0.040469	upland	0

ed. Table 3 indicates the presently known sites, together with their locations. Appendix B contains further data concerning each site. A photographic "essay" of some of the historic houses not reported in detail is included as Appendix C. The roadways could be confirmed by direct observation in only a few instances. In these cases, the roadbed was heavily eroded, as much as two meters below the surrounding surface. Most of the routes have been plowed frequently and are no longer visible. The routes could often, however, be traced by the orientation of older farmhouses.

PREHISTORIC SITES

X-02 (Cutpurse)

This site must be, at present, classified as a "find site". Only one artifact was located during survey and, although a great deal of chert was visible in the field, debitage and chipping debris were not seen. The artifact was located on an eroded Irwin soil surface, with buried deposits unlikely. The artifact recovered was a hafted scraper, probably Archaic (Figure 8b).

X-03

Although this site could not be relocated due to heavy undergrowth, the landowner was very positive about is location. His collection (Plate 3), indicates the likelihood of a Chelsea Phase Archaic site. The landowner reports that artifacts were turned up with deep-plowing, but that none have need noted since that technique was abandoned about twenty years ago. This suggests that the site is largely undisturbed, and should be investigated. If deeper deposits are prent, this site might be utilized to examine the earlier archaic record which was poorly represented at El Dorado Lake. It is located on an eroded Verdigris terrace on the north side of Hickory Creek, about two miles east of its confluence with the Little Walnut River.

X-04 (Squirrel)

A variety of debitage and debris, including a utilized flake (Figure 8c), was collected from this site. It was fairly obviously size graded and primarily in the thin drape resulting from minor erosion in the field directly to the south (Plate 4). The impression of all members of the field crew was that the site itself was in the field, but a determined search did not reveal its location. It is suggested that a series of test pits be placed along a north/south transect to determine the exact location of the site. This could not be accomplished during the survey due to standing crops.

X-07 (Kaw Camp)

This site is located on a terrace on the north side of Hickory Creek (Plate 5). It was reported to the survey crew by the owner, who indicated that a large collection of "tomahawk heads" and points have been collected over the years. Family tradition (dating back to A.D. 1867) indicates that the site was used by the Kaw during their annual migration to Emporia to trade. It seems unlikely that the reported stone tools are related to historic Kaw encampments, and may represent earlier occupations. This site is located very near the old east/west roadway (see R-02, Historic Roads, below), and may as easily have been used by the Osage and/or Wichita. It is recommended that this site be tested.

X-11 (Indian Village)

This site is technically outside of the project area, but was one of several locations suggested by the GLO maps as possible sites. It is located on a fill terrace along the Little Wal-

Table 3. Sites in the Project Area.

Site #	Name	¼	¼	¼	Sec.	TS	RE	Elevation	
Prehistoric									
14BU2	None	SE	SE	SE	17	28	5	1220	1230
14BU314	None	N½	S½	SW	31	27	6	1280	1290
14BU315	None	SE	NE	SW	31	27	6	1280	1290
14BU316	None	SE	SE	SE	36	27	5	1270	1280
14BU317	None		S½	SW	29	27	6	1290	1300
14BU318	None	SW	SE	NW	22	27	6	1310	1320
14BU319	None	NW	SE	SE	21	27	6	1310	1320
14BU320	None	SW	SE	SE	21	27	6	1320	1330
14BU321	None	NE	NW	SW	22	27	6	1310	1320
14BU322	None	NE	NW	SE	21	27	6	1310	1320
14BU323	None	NW	NW	NW	28	27	6	1310	1320
14BU540	None	NW	SE	NE	16	28	6	1310	1320
14BU542	None	SE	NE	SE	16	28	5	1240	1250
14BU543	None	NE	SW	SE	8	28	5	1230	1240
14BU561	None	SE	NE	NE	29	27	6	1310	1320
		SW	NW	NW	28	27	6	1310	1320
14BU562	None	SE	NE	NE	29	27	6	1300	1310
14BU563	None	NW	SW	NE	16	28	6	1310	1320
		NE	SW	NE	16	28	6	1310	1320
14BU564	None	SE	SW	SW	31	27	6	1280	1290
X-02	Cutpurse	NE	SW	NW	15	28	5	1280	1290
X-03	None	S½	SE	SW	16	28	5	1240	1250
X-04	Squirrel	NE	SE	SW	3	28	5	1240	1250
X-07	Kaw Camp		S½	NW	14	28	5	1240	1260
X-11	Indian Village		SE	SE	26	28	4	1200	1210
X-12	Old Indian Field	W½	SW	SW	14	28	5	1220	1230
		E½	SE	SE	17	28	5	1220	1230
X-14	None		SW	NW	14	28	6	1300	1310
X-15	Lambling	NW	SW	SE	20	28	5	1280	1290
X-20	Five Goat	NE	SW	SE	7	28	5	1270	1280
X-21	None	NW	NW	NW	32	27	6	1280	1300
Historic									
H-01	Webster School	NE	NE	NE	16	28	5	1280	1290
H-05	Freedom P.O.	SE	NE	NE	15	28	5	1280	1290
H-06a	Bois d'Arc Mill	SE	NW	SE	19	28	5	1210	1200
H-06b	Bois d'Arc Dam	SE	NW	SE	19	28	5	1200	1220
H-06c	Bodarc Store	SE	NW	SE	19	28	5	1210	1220
H-06d	Bois d'Arc Bridge	SE	NW	SE	19	28	5	1200	1220
H-08	Bloomington Church	SW	SW	SE	26	28	5	1310	1320
H-09	Crowley House	NW	NW	NW	14	28	5	1280	1290
H-10	School	NE	SW	SW	3	28	6	1390	1400
H-13A	Cumberland Church	SW	NW	SE	24	28	4	1310	1320
H-19	Zion Church	SW	SW	SW	33	27	5	1310	1320
H-22	Bloomington School	SE	SE	SW	26	28	5	1320	1330
Z-01	Tong Mill		W½	NW	28	27	6	1300	1310
Z-02	School #6/7		SW	SW	7	28	5	1250	1260
Z-03	Log Cabin		N½	SW	14	28	5	1220	1240
Z-04	Horsethief Haven		N½	S½	23	28	5	1320	1350
Roads									
R-01	Leon to Bois d'Arc								
R-02	Beaumont to Bois d'Arc								
R-03	Freedom to Bloomington								
R-04	Bois d'Arc to El Dorado								
R-05	Leon to Augusta								

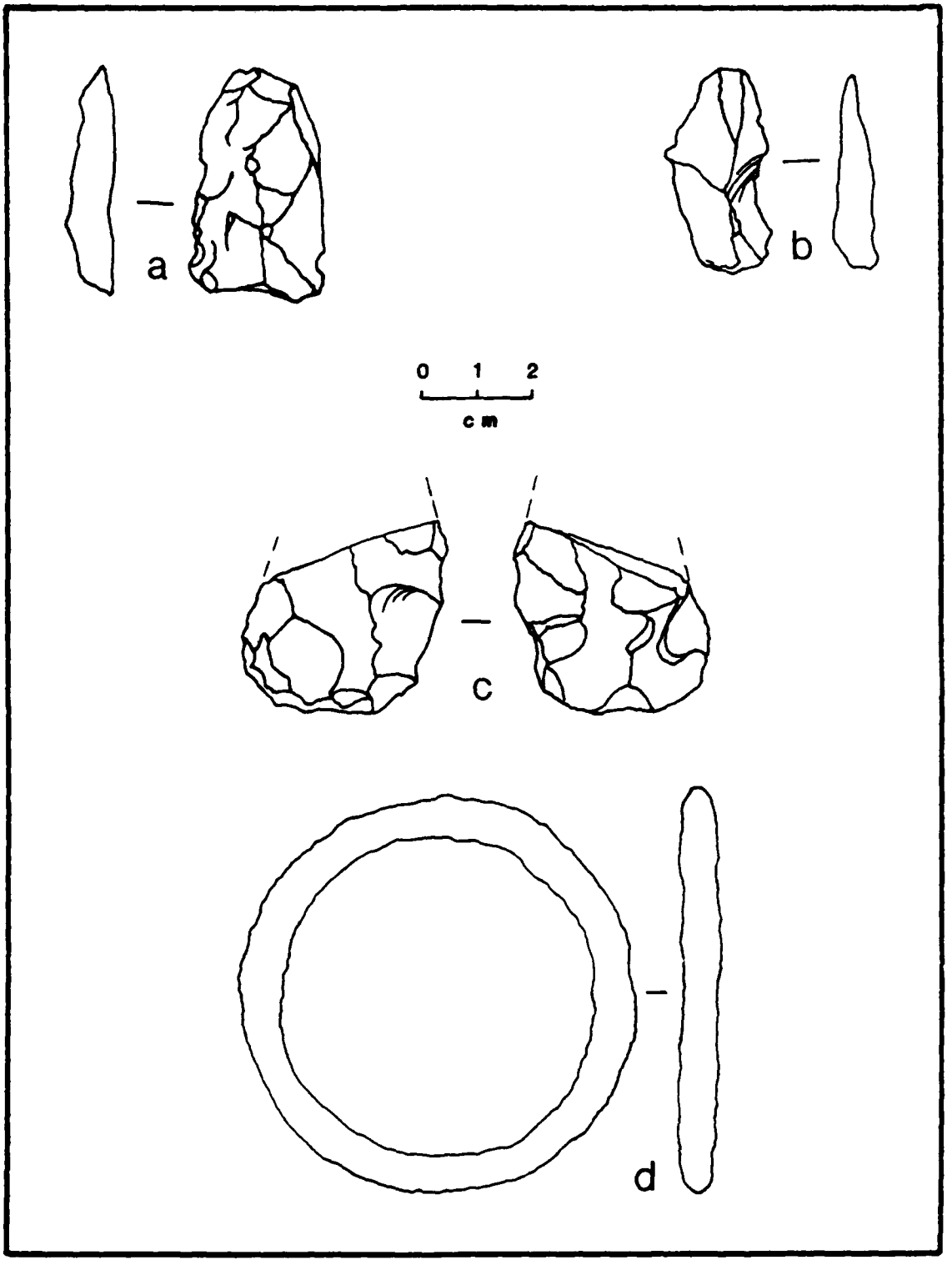

Figure 8. Artifacts. a)Hafted scraper from X-02; b) utilized flake from X-04; c) biface from X-20; d)harness ring from Bois d'Arc.

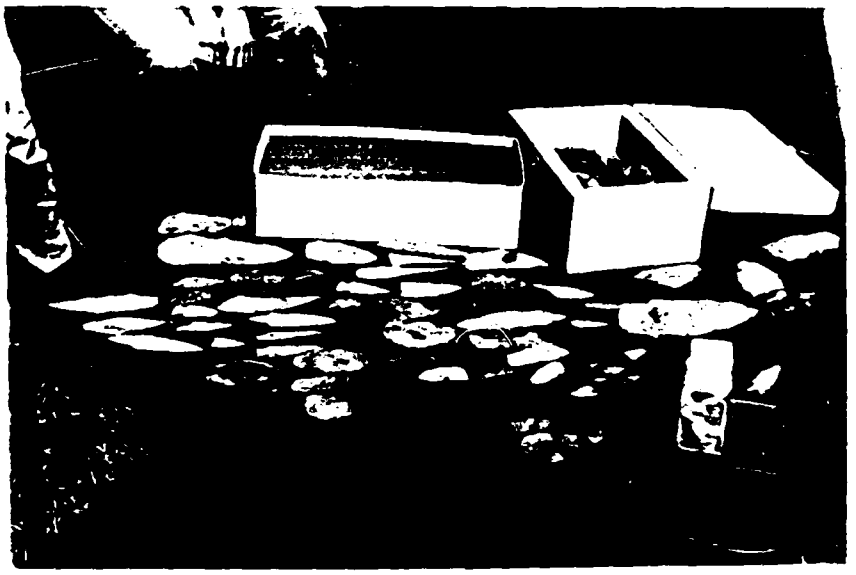

Plate 3. Private Collection. Large points and bifaces are from X-03.

Plate 4. Site Area X-04 looking west.

Plate 5. Site Area. X-07. looking north.

Plate 6. Private Collection. Small points and ceramics from X-14.

nut River and adjacent to an abandoned oxbow of the the river. Artifacts were located in and near a dark stain related to large quantities of charcoal in the soil. The location may be a plowed midden, but the charcoal appeared to be relatively fresh, and may not be related to the artifacts. The field had just been planted, prohibiting subsurface tests.

X-12 (Old Indian Field)

This location was also suggested by the GLO maps. While it may, indeed, have been and Indial Field, it is now a slightly swampy area in the midst of larger fields. 14BU2 is located at the margin of the swampy area. No materials were visible on the surface in either location, and both the neighboring landowner and the current leaseholder indicated that they had no knowledge of any prehistoric materials from this area. The neighbor indicated that this field is subject to heavy flooding from time to time, making it likely that the surface is variously exposed and reburied over time. The possibility of redepositional materials is also very high.

X-14

This site was reported by a former tenant and is well outside the study area. It is the only instance, however, in which Plains Village materials were seen. The location was noted and the tenant's collection photographed (Plate 6).

X-20 (Five Goat)

This site must be defined as a "find site" at present. A single fragment of a large, thin bigace (figure 8c) was recovered very near the undergrowth adjacent to a terrace on a minor tributary of the Little Walnut River. Although a number of other chert pieces were collected, they do not appear to be cultural. Of interest, however, were two large fragments of marl.

X-21

Two artifacts were collected from this site, a scraper and a core trimming element. A variety of other materials collected do not appear to be cultural. The site is located on an eroded Verdigris terrace on the south side of the Little Walnut River. Although the paucity of material does not suggest an important site, the fact that known sites presently do not show more indication than this one, together with the location, suggests that testing would be appropriate.

HISTORIC ROADWAYS

While of little archaeological significnce in themselves, these roadways represent routes used, most likely, in both historic and prehistoric times. They are of value in determining the general age of the houses in the area, as the older houses are oriented in relation to these roads rather than to the modern section lines. Additionally, they may represent a key to locating the late prehistoric and ealy historic Indian sites in the area. Both "Kaw Camp" and "Old Indian Village" lie along these routes.

R-01 (Leon to Bois d'Arc)

This roadway is visible as a deeply eroded gully in the Vanoss terrace in Sections 30 and 31, T27S, R6E. Its continuation is evident only by the location of farmsteads along the former route. It generally follows the high terraces and/or valley flank along the north side of the Little Walnut River southwest to a crossing in Section 3, T28S, R5E. Here it meets R-04. After crossing to the south side of the river, it follows the high terraces

again until it continues out into the floodplain in Section 8, T28S, R5E. It appears that there were alternate north and south crossings of a small tributary at that point, with the road veering more sharply south after the crossing. It passed immediately to the north of Bois d'Arc, there branching into two routes. One of these proceeds westward past Cumberland Church where it veers southward again, the other goes nearly directly to Old Indian Village.

R-02 (Beaumont? to Bois d'Arc)

This roadway similarly follows the north terraces of Hickory Creek. Its eastern extent was probably Beaumont. It meets R-01 in Section 8, T28S, R5E. This route was part of the Pony Express Route and Freedom Post Office was directly along the route. The road south to Bloomington (R-03) branched off at Freedom Post Office, as well. This route may also have been utilized by historic and/or prehistoric Indian groups (see Kaw Camp above).

R-03 (Freedom to Bloomington)

Although not located on the GLO map, this road turned directly south at Freedom Post Office to a crossing on Hickory Creek, then southward to Bloomington. It may also have extended northward to the Walnut River crossing of R-01. Remnants of the road and crossing remain visible.

R-04 (Leon to Augusta?)

This roadway branched from R-01 at its Walnut River Crossing and continued more or less westward toward Augusta. It met the north/south roadway (R-05) from El Dorado to Bois d'Arc in Section 5, T28S, R5E.

R-05 (Bois d'Arc to El Dorado?)

This roadway runs more or less north/south on the floodplain from its junction with R-01 in Section 17, T28S, R5E. Its northern extent was probably in El Dorado.

HISTORIC SITES

This survey did not attempt to identify every older structure in the area. It concentrated on the town and school locations indicated on the 1867 GLO maps, with a photographic sampling of other older structures.

H-01 (Webster School)

This structure is located in the NE/4, NE/4, NE/4, NE/4 of Section 16, T28S, R5E, at an elevation of 1290 to 1300 feet asml. It is presently in use as Webster Church. Architecturally, it is a unique example of country schools in the area. It has been given more ornate detail in construction, such as the eave supports and window details (Plates 7 and 8). It is probably not the original structure indicated on the GLO maps, its construction probably dates to the late nineteenth century. Its elevation places it within the proposed flood pool. Optimally, the site itself would be investigated and the structure relocated on higher ground should the lake be built.

H-02 (Freedom Post Office)

This early historic site is located in the SE/4, NE/4, NE/4 of Section 15, T28S, R5E, at an elevation of 1290 to 1300 feet asml. It was originally constructed as a Pony Express Station, and was then used by a local mail delivery service, the Freedom Express, as its main office. It originally included a postoffice building consisting of two two-story wings connected by a one-story section, and a separate stable for 12 horses. The construction was of oak and walnut brought from Coffeeville. The owner of

Plate 7. Webster Church

Plate 8. Eave detail, Webster Church

the site indicates that he was present during its demolition in the 1950s and reported the following details of construction:

The basic structure was of pegged post and beam construction covered, on both the interior and exterior, with oak planking. The space between the exterior and interior planks was filled with chert stream gravel. This was apparently done to provide fortification for the building. Where nails were used, they were square cut. The northern section housed the postoffice windows downstairs and quarters for a clerk upstairs. The southern wing probably provided quarters for the Pony Express riders, as well as for travellers.

The stable sat to the west of the main structure and was also of post and beam walnut construction. The stalls were arranged in pairs on the east and west side.

This site would be subjected to shorewash and inundation by the proposed floodpool, and it is recommended that test excavations, at a minimum be conducted at this site.

BOIS D'ARC

H-6a (Bois d'Arc Mill)

This structure was located on the western bank of the Little Walnut River in the NE/4, SE/4 of Section 19, T28S, R5E at an elevation of 1240 feet asml (Figure 9). It was immediately downstream from the dam, rather than to the south by the bridge where the present owner suggests. Remnants of the stone work, as well as portions of the brick originally lining the chimney remain on the site (Plates 9, 10, 11, 12). The firebrick was from Evens & Howard, St. Louis. Firebrick from a site in Rogers County, Oklahoma, with a construction date of 1871 carried the identical markings (Gaston 1983). This places the construction of the mill in the middle to late nineteenth century. The stonework fragments are not necessarily in situ. The current owner indicates that he recovered some of them from the field directly to the west. Pedestrian survey of the field recovered a harness ring (figure 8d) and several pieces of limestone. The evidence suggests that the mill was blown down at the same time as the dam (ca. 1943). Because of the conditions of its demolition, it is unlikely that intensive subsurface investigation would be indicated.

H-6b (Bois d'Arc Dam)

This dam was located in the NE/4, SE/4 of Section 19, T28S, R5E at an elevation of 1230 to 1240 feet asml. It is located on the Little Walnut River southwest of its conjunction with Hickory Creek (Figure 2, Figure 9). It was of concrete construction. Although the dam was dynamited during the 1940s, the approaches and foundations remain in place (Plates 13 and 14). While it could not be confirmed, the dynamiting was probably required due to build-up of debris behind the dam following the intensive flooding in the early 1940s. Portions of the dam itself now lie in the river bed to the south of the original location. A fragment of the inscribed date was found on the eastern bank by the present owner (Plate 15), but, unfortunately, lacked the year.

H-6c (Bodarc Store)

This structure is located in the NW/4, SE/4 of Section 19, T28S, R5E at an elevation of 1240 feet asml (Figure 9, Plates 16 and 17). Although some local lore suggests that this building was constructed of materials from the mill, the date of destruction of the mill is much later than many of the dates inscribed on the storefront (Plate 18).

A commemorative plate depicting the store was issued during the 1920s. It was probably in commemoration of its 50th year, placing construction ca. 1875. The masonwork, as well as the staining of the native limestone, suggest that it was contemporaneous with the mill.

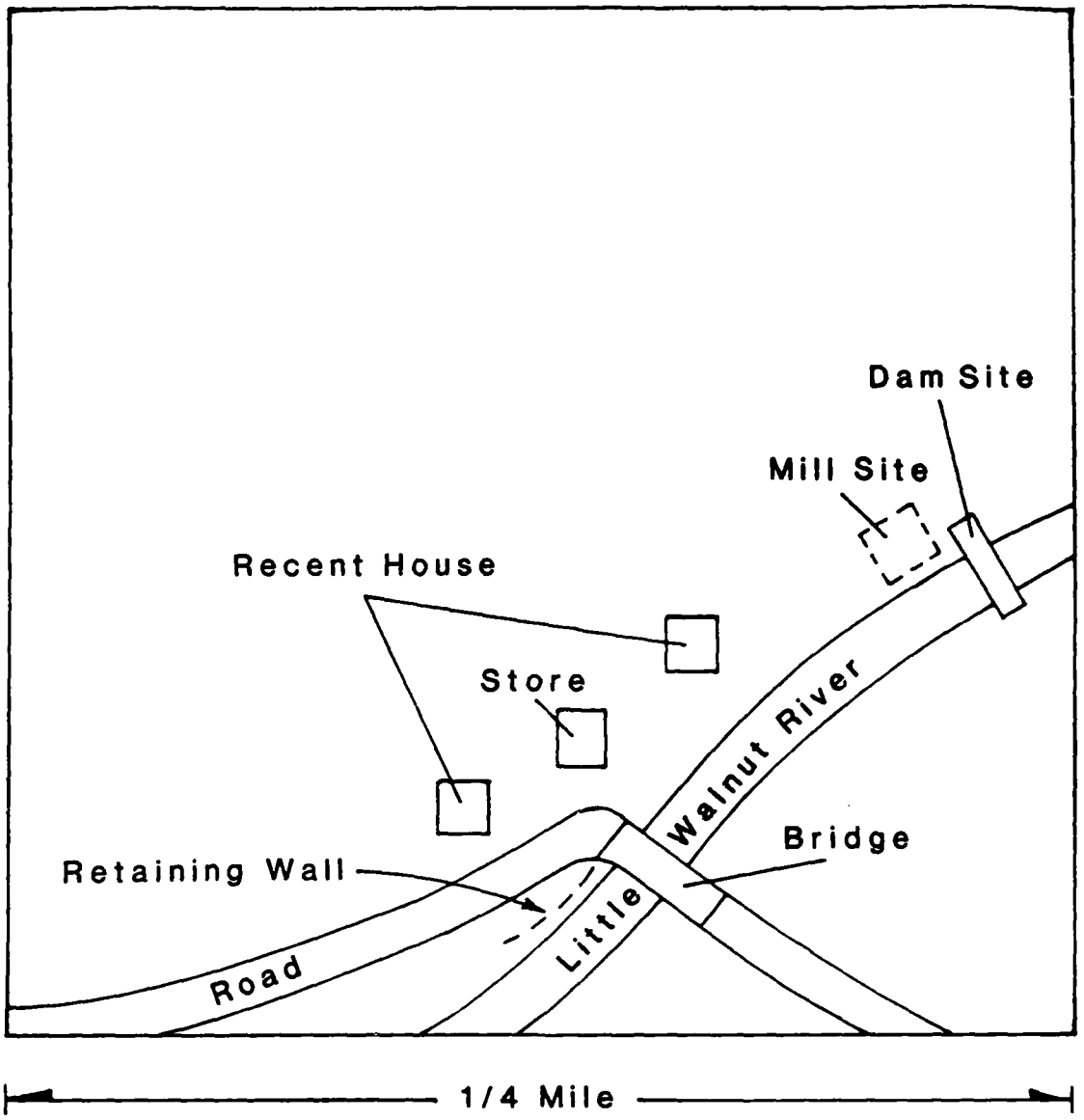

Figure 9. Bois d'Arc.

Plate 9. Concrete Footings from Bois d'Arc Mill.

Plate 10. Stone Debris from Bois d'Arc Mill.

Plate 11. Stone Debris from Field West of Mill Site.

Plate 12. Firebrick from Bois d'Arc Mill.

Plate 13. Western Approach to Bois d'Arc Dam

Plate 14. Foundation of Bois d'Arc Dam.

Plate 15. Dated Fragment from Bois d'Arc Dam.

Plate 16. Bodarc Store, south side.

Plate 17. Bodarc Store, east side.

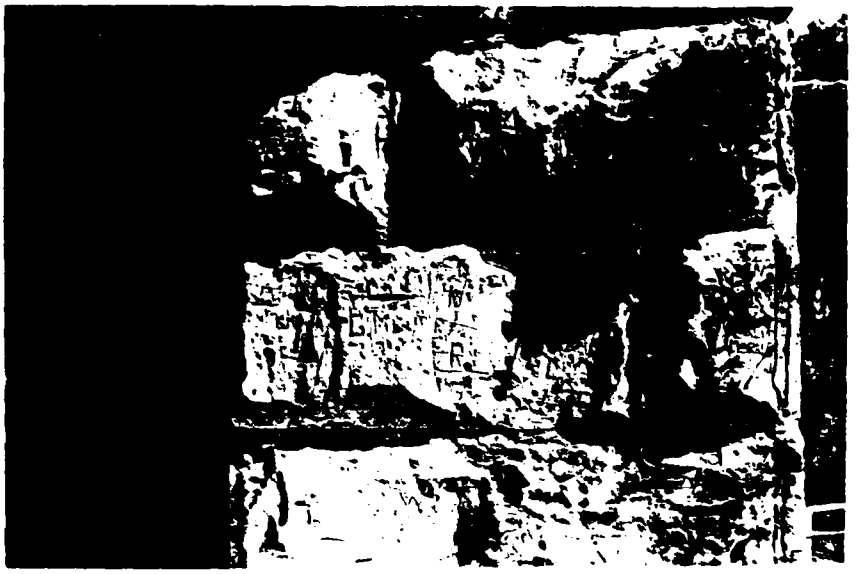

Plate 18. Bodarc Storefront with Carved Inscripstions.

A knowledgeable local informant indicated that the store was in operation until the early 1940s. At that time, it was operated by the Windsor family. A descendant of the family now resides in the NW/4 of Section 18, T28S, R5E. The floods of the 1940s apparently caused sufficient damage to the operation that the store was permanently closed.

This stone masonry building has been moderately well-maintained. It suffered some damage during the flooding in 1976 which inundated the lower floor. The present owner indicated an inability to pay for further maintenance. It is not clear from the maps whether or it would be endangered by dam construction, but it would certainly be subject to floodstage water releases. It is recommended that an effort be made to preserve this building.

H-6d (Bois d'Arc Bridge)

This bridge spans the Little Walnut River in the NW/4, SE/4 of Section 19, T28S, R5E, at an elevation of 1240 feet asml (Figure 9, Plate 19). The bridge supports are of stone masonry on concrete footings. The span is of angle iron and the bridge floor is wooden plank. No construction date could be located on the bridge itself. The masonry appears to be contemporary with that of the store. A retaining wall of large limestone blocks was constructed on the west bank just south of the bridge (Plate 20). It is suggested that an effort be made to preserve this bridge.

H-08 (Bloomington Church)

This structure is located in the SW/4, SW/4, SE/4 of Section 26, T28S, R5E, at an elevation of 1340 to 1350 feet asml. It has been partially demolished (Plate 21). The basic construction was of red brick. The site is not endangered by the proposed lake.

H-09 (Crowley House)

This house is in the NW/4, NW/4, NW/4, NW/4 of Section 14, T28S, R5E, at an elevation of 1290 to 1300 feet asml. The basic structure of this typical area farmhouse is a frame two story house with two one-story additions (Plate 22). It is in a good state of repair. The land deed, as reported by the owner, is a federal patent purchased in 1867. The owner indicated that this house, the second built by his ancestor, was constructed about 1905 The house is of local historical significance in that it was built by an "original settler". Its elevation places it within the proposed lake floodpool.

H-10 (School)

This structure is located in Section 3, T28S, R6E at an elevation of 1340 to 1350 feet asml (Plate 23). It is currently in use as a 4H building. It is a typical example of a one-room country school of frame construction. The original outbuildings (outhouse and stable) are still in place. The site is not endangered by the proposed lake.

H-13a (Cumberland Church)

This church is located in the NE/4, SW/4 of Section 24, T28S, R4E, at an elevation fo 1240 to 1250 feet asml. It was built in 1929. It is of mixed construction, with several later additions evident. It is not directly endangered by the proposed lake. It possibly would be endangered by floodstage releases from the dam. It does not present architectural uniqueness requiring preservation. Its historic significance was not investigated. However, the cemetery located to the south (C-13b) contains graves of sufficient age to suggest that an earlier church structure was situated in the area.

X-15 (Lambling)

This site is located in the SE/4 of Section 20, T28S, R5E. It is located near the top of an upland ridge. A large tree sits in a sunken area much as would be expected at a prehistoric

Plate 19. Bois d'Arc Bridge, looking south.

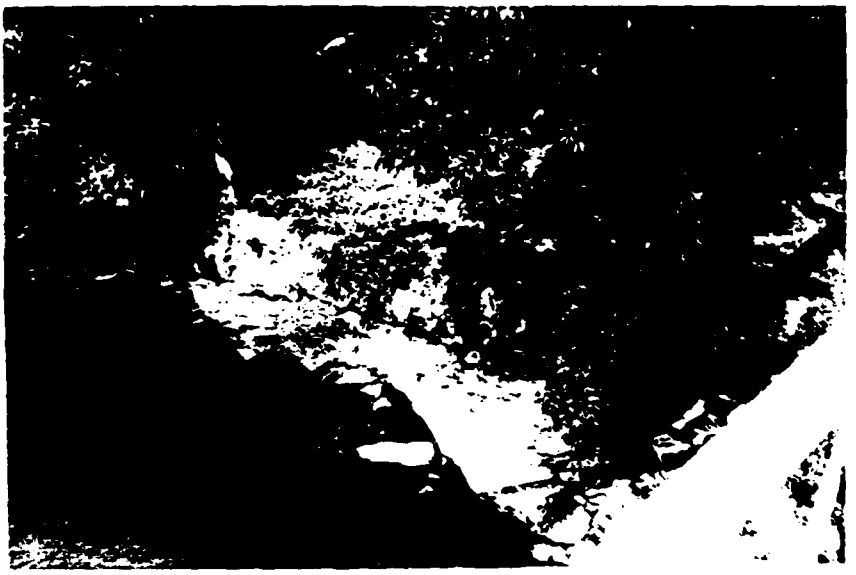

Plate 24. Stone Retaining Wall at Bois d'Arc Bridge.

Plate 21. Bloomington Church, looking northwest.

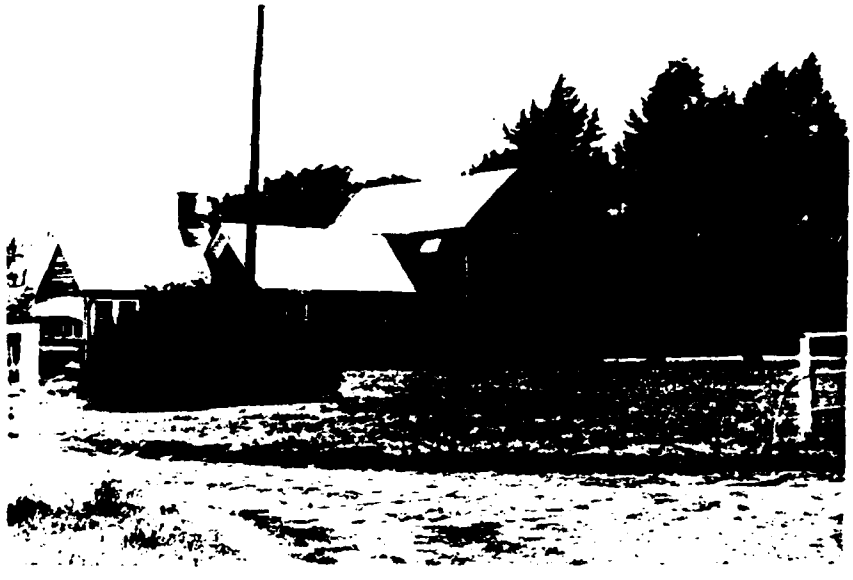

Plate 22. Crowley House, looking south.

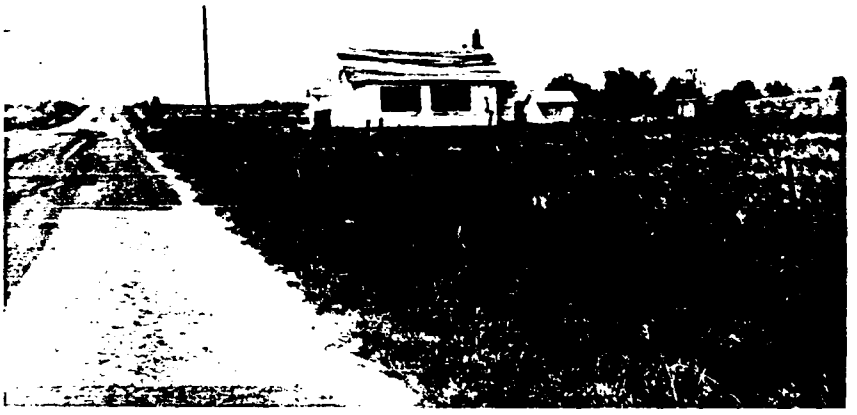

Plate 23. School (H-10), looking north.

Plate 24. Zion Church, looking north.

quarry site. A shrubby area to the north of the tree may indicate the location of a historic structure or midden. Prior test excavations were clearly evident at the site, as the test pits had not been backfilled. No report could be located relating to this area. The leaseholder reported that the "dam surveyors" had recovered "arrow points" from the field. However, no evidence of prehistoric occupation was found during the current survey. A stoneware potsherd and several glass fragments were collected from beneath the tree. A local informant indicated that the tree is in a recent (ca. 10 year old) sink hole. As this area would be endangered by the dam approaches, it is suggested that further testing be done.

H-19 (Zion Church)

This structure, originally a country schoolhouse (Plate 24), is located in the SW/4, SW/4 of Section 33, T28S, R5E at an elevation of 1340 to 1350 feet asml. It is a very typical example of the one room country school, amny of which are still standing in the area. It is not directly endangered by the proposed lake. It would, however, be isolated from the existing roadways at floodstage, and access from the east would be cut off by the conservation pool, as well.

H-22 (Bloomington School)

This structure, originally was located in the SE/4, SW/4, SW/4 of Section 26, T28S, R5E at an elevation of 1340 to 1350 feet asml. The foundation is all that remains. Local informants indicate that it was a modern building "complete with a stainless steel kitchen". The site of the earlier school building located on the GLO maps is not evident, and was probably destroyed when this building was erected. The site is not endangered by the proposed lake.

POSSIBLE HISTORIC SITES NOT LOCATED

In addition to the sites described above, two additional sites were indicated on the GLO maps, but could not be located. An additional two were reported by a landowner, but were at that time inaccessible.

Z-01 (Tong Mill)

This site is reported to be the original location of Leon. The maps appear to place it along the Little Walnut River in the northern portion of Section 28, T27S, R6E. An earlier survey did not relocate the site, despite covering the indicated area. It is suggested only that future surveys be aware that it should be there--somewhere.

Z-02 (School #6/7)

Although the probable location for this school (Section 7, T28S, R6E) was examined, no evidence of a structure was apparent. This area, however, included part of the old roadway, and tracing that may turn up evidence of the true location.

Z-03 (Horsethief Haven)

This site, originally a two-story house, was reported by a local informant to stand in the south half of Section 13, T28S, R5E. The house was, according to legend, the home base of a group of "horsethieves" who used the bluff above the house as a lookout from which they could see anyone coming from El Dorado or Augusta. The burial reported to have washed out of the bank of Hickory Creek was that of one of the alleged horsethieves. This site should be located and tested.

Z-04 (Log Cabin)

This site is reported by the pres-

ent owner in the south half of Section 14, T28S, R5E and close to Hickory Creek. It was built in 1867 by an original settler. It is reported as no longer standing. This site should be located and tested.

CEMETERIES

Four cemeteries are located just outside the project area. Although not endangered by the proposed lake, the most severe flooding conditions could subject the lowest elevations to undercutting by shorewash.

C-13b (Little Walnut Cemetery)

This cemetery is located in the NE/4, SW/4 of Section 24, T28S, R4E at an elevation of 1230 to 1240 feet asml (Plate 25). It is not endangered by the floodpool and is located about 1¼ miles downstream from the dam location. It is currently in use, but contains graves as old as 1875.

C-16 (Garrison Cemetery)

This cemetery is located in the NE/4, SE/4 of Section 27, T27S, R5E at an elevation of 1310 to 1320 feet asml (Plate 26). It is, however, approximately ¼ mile from the closest approach of the floodpool and would not be expected to be endangered. It is currently in use and appears to contain about 150 burials.

C-17 (Bogel Cemetery)

This cemetery is located in the SW/4, NE/4 of Section 12, T28S, R5E at an elevation of 1310 to 1320 feet asml. It is located about 1/8 mile from the closest approach of the floodpool and would not appear to be endangered. Although fenced, it does not appear to be maintained. A number of graves do not have markers. The oldest date located was 1874, but the unmarked graves may be older. The lack of markers makes it difficult to estimate the total number of graves. A very rough estimate would be about 100. Some gravestones are virtually on the fenceline, suggesting that some burials may not be enclosed within the fence.

C-18 (Bogel Cemetery)

This cemetery is located in the NW/4, NW/4 of Section 28, T27S, R6E at an elevation of 1300 to 1310 feet asml. The present riverbed of the Little Walnut River approaches the southeast corner of the cemetery (within about 10 m.). While graves in this cemetery date back to 1867, it is currently being used for burials, and appears to contain several hundred graves.

SUMMARY OF THE SURVEY

The results of survey indicated the expected distribution of prehistoric sites based on the soil geomorphology and general assumptions concerning human behavior. Valley flank and upland sites are small and deflated. Floodplain and terrace sites are buried, but often no deeper than the old plowzone. These appear to have both a higher density of materials within the sites and greater site area than the upland sites. The apparent higher density of artifacts and sites, however, may result from the higher frequency of plowed fields on terraces and floodplains.

Historic houses occupy both the floodplains and the valley flanks at approximately the same density throughout the area. It is likely, however, to encounter early historic sites very close to the rivers, with late

Plate 25. Little Walnut (Cumberland) Cemetery, looking south.

Plate 26. Garrison Cemetery, looking northwest.

nineteenth century and later houses on the valley flanks. Except for stone structures, the very early historic structures appear to be gone. However, the description of the Freedom Post Office construction suggests that at least some are likely to be standing.

The historic roadways skirted the river bottoms on the higher terraces throughout most of their lengths. However, they descended onto the floodplain as they approached Bois d'Arc from points north, and remained fairly close to the river south of that point.

Cemeteries are located above the floodpool. Local informants, however, have observed historic graves washing from the river banks. One such grave is reported to have included brass coffin handles, spurs, shell shirt buttons, and some leather goods, but bone was not preserved. No prehistoric graves or cemeteries have been reported for the area.

PREDICTIONS FOR ENCOUNTERING SITES, THEIR TYPES, AND THEIR MITIGATION NEEDS

The data bases for the predictions may be divided into several topic areas. These include the size, topographical location, and number of sites encountered in each survey area, together with the percentage of the total project area in each topographical location. These data allow for estimating the number of sites likely to be encountered during a 100% survey. All sites reported for the area, together with their size, artifact density, recommendations, and endangerment were considered in determining the probable number of sites requiring some form of mitigation (i.e. test, excavation, or preservation).

Prehistoric Sites

The number of prehistoric sites likely to be encountered are tabulated in Table 4. These results indicate that the majority of prehistoric sites will be located on terraces adjoining the two waterways, and probably will be buried. The majority of these sites should be tested to determine their horizontal and vertical extent before predictions concerning the need for mitigation can be made. Although a number of prehistoric sites will be encountered on the valley flanks, only those located on the minor tributary terraces are likely to be buried. The majority of these tributaries have, however, been disturbed by flood control and/or water conservation projects. Where undisturbed terraces on minor tributaries still exist, intensive survey is suggested.

Historic Sites

Historic sites are located more evenly on the landscape. While each deserves investigation to determine any historic significance, intensive on-site investigation should be limited to sites likely to yield information on the lifestyles of particular settlement and historic periods (i.e., historic Indian, early settlement, oil boom). The number shown in Table 5 requiring mitigation overstates the need for intensive on-site investigation by including the search for historic significance. In a very few instances, such as Webster Church, the buildings themselves might be moved to higher locations.

Bois d'Arc is the only endangered townsite, and the extent of its endangerment is not clear. Neither the dam nor the mill site require preservation. The store should be preserved and, if possible, the bridge. It is unlikely that the store could be successfully moved.

Historic Roadways

The early historic roadways, which may predate white settlement, should be surveyed along their length, with an eye for appropriate campsite loca-

Table 4. Predictions for Prehistoric Sites

Location	km^2 surveyed	# sites	density	% project area	# expected sites	% to be mitigated	# to be mitgated
floodplain	0.729	1	1.371	39.23%	13	42.86%	6
terrace	1.591	9	5.659	22.63%	31	42.60%	13
valleyflank	0.779	2	2.567	26.14%	16	2.78%	0
upland	0.809	1	1.236	12.00%	4	0.00%	0
sums	3.908	13		100.00%	63		19

Table 5. Predictions for Historic Sites

Location	km^2 surveyed	# sites	density	% project area	# expected sites	% to be mitigated	# to be mitgated
floodplain	0.729	4	1.25	39.23%	12	90.00%	11
terrace	1.591	1	1.25	22.63%	7	0.00%	0
valleyflank	0.779	5	1.25	26.14%	8	40.00%	3
upland	0.809	7	1.25	12.00%	4	57.14%	2
sums	3.908	17		100.00%	30		16

tions (white or Indian). They may also afford a useful key in determing the ageof historic structures. In themselves, however, they do not require preservation or extensive investigation.

Cemeteries

Known cemeteries are, apparently, exclusively white settlement to modern in age, and all lie at higher elevations. A local informant reported a single historic burial washed out of the banks of Hickory Creek. The burial was of known age (ca. A.D. 1875), and washed out during the 1940s. Preservation was very poor, even after only 65 years, with only metal findings, shell buttons, and tanned leather surviving. However, the informant indicated that the burial fill was very evident.

No prehistoric cemeteries or burials have been recorded for the area. Two factors limit the probabilities of encountering these: (1) the acidity of the organic floodplain and terrace soils suggests that bone preservation would be poor in these soils. (2) Only the soils of the valley flanks, terraces, and floodplains have sufficient depth to allow burial. The highest likelihood of encountering intact burials is, therefore, in the Irwin and Ladysmith soils in the valley flank. This is the area most likely to experience shoreline wash, and ongoing monitoring of these areas would be necessary.

Table 6. Predictions for Historic Roadways

Location	density	% project area	km^2
floodplain	.0067	39.23%	0.061
terrace	.0604	22.63%	1.448
valleyflank	.3400	26.14%	0.080
upland	.0000	12.00%	0.000
sums	.0704	100.00%	1.690

SITE DISTRIBUTIONS: PAST VS. PRESENT

While the predictive model is designed to estimate the present distribution of sites on the landscape, it should not be taken to be a direct reflection of prehistoric densities. Several natural and man-made forces have probably acted, alone and in combination, to remove sites from specific portions of the landscape.

Two human activities, in particular, are evident in the area: gravel quarries and flood control impoundments. The gravel terraces noted by Haury (1984) have been extensively quarried for roadfill and similar purposes. This has severely reduced the likelihood of locating lithic workshops in relation to gravel terraces. The flood control operations have inundated the majority of springs and seeps outwelling from under the bedrock cap, locations where prehistoric sites might otherwise be expected. The larger of the tributaries have several such earthworks along their lengths. In some instances, the tributaries appear to have been canalized, as well. Both the building operations and the impounded waters have reduced the likelihood of finding sites along the minor tributaries.

As noted earlier, the Vanoss terraces appear to be easily eroded. Unfortunately they represent the most likely locations for buried prehistoric sites. Erosion of early roadways along these terraces has virtually removed a significant portion of the terraces and significantly reduced the likelihood of locating sites on or in them.

An additional source of damage, affecting primarily the upland areas, has been the extensive oil drilling operations of the past. The majority of the uplands are over extensive oil fields, with many wells drilled during the early part of the twentieth century. Oil contaminated lands are noted in a number of locations by the Soil Conservation Survey (Penner et al. 1975. Less obvious are the extensive ponds related to early drilling operations.

Farming techniques of the nineteenth and early twentieth century included deep plowing, with pride to be had in the straightness of the furrow. This technique is now recognized to encourage serious erosion problems, and has not been in use for more than twenty years. However, ninety years of deep plowing and subsequent erosion, as confirmed by the Soil Conservation Survey indications of many areas of serious erosion, has probably removed many surface and buried sites from the area.

Changes in the water table incurred both by water impoundments and oil drilling operations have resulted in the speeding up of karst processes in the underlying limestone bedrocks. A

number of sinkholes are reported to have appeared in recent years. As prehistoric quarry sites also tend to speed karst processes by pooling water near the surface, such quarry sites may be the location of modern sinkholes. This would tend to obscure the quarry sites.

In terms ot site distribution, these factors probably would have (1) removed or obscured the evidence of upland sites; (2) removed most evidence from the upper reaches of the minor tributaries on the valley flanks; (3) removed evidence of workshops associated with gravel terraces; (4) deflated sites where plowing has occurred; (5) eroded a number of second terraces; and (6) alternately eroded and buried floodplain sites.

Therefore, any models of the prehistoric distributions of sites on the landscaped should allow for these biases in present site distributions.

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APPENDIX A

SOILS INFORMATION

Table I. Locations of Soil Examinations

¼	¼	¼	Sec.	TS	RE	Core	Cutbank	Soil
SW	NW	NW	28	27	6	X		Norge
SW	SE	SE	30	27	6	X		Olpe-Norge, Vanoss
NE	NE	NE	31	27	6		X	Verdigris
NW	SW	NW	16	28	6		X	Verdigris
SE	NE	SE	16	28	5		X	Verdigris, Norge
SE	SE	SE	34	28	5	X		Labette, Verdigris
SW	SE	SE	36	27	5	X	X	Verdigris

Table II. Description of Soils of the Study Area

Name	Horizon	Munsell	Munsell	Munsell	Content 1	Content 2	pH	Min	Max	Parent Material
Brewer	A1	10YR4/1			silty clay loam		s. acid	0	14	clayey alluvium
Brewer	B1	10YR3/1			silty clay loam, h.		s. acid	14	21	
Brewer	B2t	10YR4/1			silty clay		neutral	21	41	
Brewer	C	10YR4/1			silty clay		neutral	41	66	
Clime	A1	10YR3/1			silty clay		m. alkaline	0	9	calcareous shale
Clime	AC	2.5YR5/3			silty clay	limestone	m. alkaline	9	26	
Clime	C	5YR6/3			silty clay	limestone	m. alkaline	26	33	
Clime	R	5YR6/2	5YR7/4		clayey shale	soft lime	m. alkaline	33		
Dwight	A1	10YR4/1			silt loam		s. acid	1	5	cherty limestone
Dwight	B21t	7.5YR3/2			silty clay		neutral	5	16	
Dwight	B22t	7.5YR4/3			silty clay		m. alkaline	16	26	
Dwight	B3	7.5YR4/3			silty clay	Fe-Mn,CaCO	m. alkaline	26	33	
Dwight	R	7.5YR4/3			cherty limestone	r/b clay		33		
Florence	A1	10YR3/1			silt loam	chert	s. acid	0	14	cherty limestone
Florence	B1	5YR3/3			silty clay	chert	s. acid	14	22	
Florence	B21t	2.5YR3/4			coarse clay	chert,Fe-Mn	s. acid	22	35	
Florence	B22t	2.5YR3/4			coarse clay	chert,Ca	m. alkaline	35	45	
Florence	R	2.5YR3/4			cherty limestone	red clay		45		
Irwin	A1	10YR4/2			silty clay loam		s. acid	0	11	clayey sediment
Irwin	B21t	10YR4/2			silty clay loam		neutral	11	21	
Irwin	B22t	10YR4/2			silty clay		neutral	21	26	
Irwin	B3	7.5YR5/4	5YR4/8		silty clay	mottles	m. alkaline	26	42	
Irwin	C1	5YR4/4	10YR6/6		silty clay	mottles	m. alkaline	42	46	
Irwin	C2	5YR4/4	10YR6/2	5YR4/8	silty clay	mottles,ang.chert	m. alkaline	46	66	
Labette	A1	10YR4/2			silty clay, light		s. acid	0	13	limestone/shale
Labette	B1	7.5YR3/2			silty clay, light		s. acid	13	18	
Labette	B2t	5YR4/6			silty clay, light		s. acid	18	31	
Labette	B3	5YR4/6			silty clay, heavy	ang. chert	s. acid	31	38	
Labette	R	5YR4/6			cherty limestone			38		
Ladysmith	A1	10YR4/1			silty clay loam, l.		s. acid	0	8	clayey sediment
Ladysmith	B21t	10YR3/2	7.5YR4/8		silty clay	mottles	s. acid	8	18	

Table II. Description of Soils of the Study Area (cont.)

Name	Horizon	Munsell	Munsell	Munsell	Content 1	Content 2	pH	Min	Max	Parent Material
Ladysmith	B22t	10YR4/2	7.5YR4/8		silty clay	mottles	s. acid	18	34	
Ladysmith	B3	10YR6/3	7.5YR5/6		silty clay, light	l.silty clay,FeMn	m. alkaline	34	38	
Ladysmith	C1	5YR4/6	10YR4/2	10YR5/2	silty clay, light	l.silty clays	m. alkaline	38	55	
Ladysmith	C2	2.5YR3/6	10YR5/3		clay	Fe-Mn	m. alkaline	55	66	
Norge	A1	7.5YR4/2			silt loam, heavy		s. acid	0	9	loamy sediment
Norge	B1	5YR4/3			silty clay loam		s. acid	9	18	
Norge	B21t	5YR4/5			silty clay loam	Fe-Mn	s. acid	18	32	
Norge	B22t	5YR5/5			silty clay loam, h.	Fe-Mn	s. acid	32	42	
Norge	B31	5YR5/6			silty clay loam, h.	Fe-Mn	s. acid	42	56	
Norge	B32	5YR5/6			silty clay loam		s. acid	56	72	
Olpe	A1	7.5YR3/2			silty clay loam	rounded chert	m. acid	0	10	gravelly/clayey
Olpe	B1	5YR4/2			silty clay loam, h.	chert pebbles	s. acid	10	14	sediment
Olpe	B21	2.5YR3/6			chert gravel	h.silty clay loam	s. acid	14	30	
Olpe	B22t	2.5YR4/6	7.5YR4/2		clay	chert pebbles	neutral	30	42	
Olpe	B3	10YR6/3	2.5YR3/6	several	chert gravel	gravelly clay	m. alkaline	42	55	
Sogn	A1	10YR3/1			silty clay loam, l.		m. alkaline	0	7	limestone
Sogn	R	10YR3/1			platy hard limestone			7		
Tully	A1	10YR3/1			silty clay loam		s. acid	0	10	slopewash/
Tully	B1	10YR4/2			silty clay loam, h.		s. acid	10	16	colluvium
Tully	B21t	7.5YR4/3			silty clay		s. acid	16	25	
Tully	B22t	10YR5/3			silty clay	limestone	s. acid	25	52	
Tully	B3	5YR5/2			silty clay		neutral	52	64	
Vanoss	A1	10YR4/1			silt loam		s. acid	0	12	loamy sediment
Vanoss	B1	10YR4/2			silty clay loam		s. acid	12	18	
Vanoss	B2t	7.5YR5/3			silty clay loam		s. acid	18	35	
Vanoss	B3	7.5YR5/4			silty clay loam,l.		s. acid	35	57	
Verdigris	Ap	10YR4/2			silt loam		s. acid	0	8	loamy alluvial
Verdigris	A11	10YR4/1			silty clay loam		s. acid	8	16	sediment
Verdigris	A12	10YR4/1			silty clay loam		s. acid	16	33	
Verdigris	AC	10YR3/2	7.5YR5/6		silty clay loam	mottles	s. acid	33	57	

APPENDIX B

SITE INFORMATION

Table III. Site Data

Site	Soil	Depth	Location	Dr.	DTW	Size	Affil.	Recom.	Comments
14BU2	Verdigris	unknown	floodplain	HC	100	2000	unknown	none	may be mismapped
14BU314	Verdigris	unknown	floodplain	LW	20	40500	unknown	none	
14BU315	Verdigris	unknown	terrace	LW	20	13000	unknown	testing	
14BU316	Vanoss	unknown	floodplain	LW	25	20250	unknown	none	
14BU317	Verdigris	unknown	floodplain	LW	20	16500	unknown	none	
14BU318	Verdigris	unknown	valleyflank	LW	20	101000	Woodland Historic	testing	not endangered
14BU319	Verdigris	unknown	terrace	LW	20	24000	unknown	collect	could be flood undercut
14BU320	Verdigris	unknown	floodplain	LW	20	12000	Middle Ceramic	testing	highway will destroy
14BU321	Vanoss	unknown	terrace	LW	20	4600	unknown	salvage	
14BU322	Verdigris	unknown	valleyflank	LW	20	14500	Middle Woodland	testing	
14BU323	Norge	surface	valleyflank	LW	30	8000	unknown	none	deflated site
14BU540	Verdigris	unknown	terrace	HC	25	?	unknown	none	
14BU542	Verdigris	unknown	terrace	HC	30	?	Archaic	testing	colluvial chert, real site?
14BU543	Verdigris	unknown	terrace	LW	20	?	unknown	testing	
14BU561	Norge	surface	valleyflank	LW	80	?	unknown	none	
14BU562	Norge	surface	valleyflank	LW	40	?	unknown	none	
14BU563	Verdigris	unknown	terrace	HC	30	?	unknown	testing	
14BU564	Verdigris	unknown	terrace	LW	30	?	unknown	testing	
X-02	Irwin	unknown	valleyflank	HC	310	10	Archaic?	testing	find site, gravelly
X-03	Verdigris	unknown	terrace	HC	10	40000	Middle Archaic	testing	
X-04	Verdigris	unknown	floodplain	LW	10	100	unknown	testing	find exact location
X-07	Verdigris	unknown	terrace	HC	10	75000	Historic unknown	testing	Probably prehistoric may also be historic
X-11	Labette-Sogn	unknown	terrace	LW	40	80000	Historic	testing	Osage or Wichita?
X-12	Verdigris	unknown	floodplain	HC	20	100000	unknown	testing	nothing on plowed surface
X-14	Verdigris	unknown	terrace	HC	?	?	Plains Village	testing	not endangered
X-20	Irwin	unknown	valleyflank	LW	90	10	unknown	testing	find site
X-21	Verdigris	unknown	terrace	LW	20	100	unknown	none	

Dr.=Drainage (LW=Little Walnut River, HC=Hickory Creek, DTW=distance to water in meters, Size=area of site in square meters.

Table IV. Chipped Stone Collected from Sites in the Study Area.

Site	Chipped Stone Tools: BF	PT	SC	GR	RT	UT	TOT	Debitage: C	CT	1st	2nd	3rd	BFT	TOT	Debris: CH	CK	TOT
14BU2	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0
14BU314	0	0	0	0	0	0	0	1	0	0	0	38	0	39	0	3	3
14BU315	0	0	1	0	0	0	1	2	0	0	0	67	0	69	0	0	0
14BU316	0	0	0	0	0	0	0	0	0	0	0	5	0	5	0	0	0
14BU317	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11
14BU318	1	1	0	0	0	0	2	6	0	0	0	0	0	6	0	81	81
14BU319	0	0	2	0	0	0	2	2	0	0	0	13	0	15	0	10	10
14BU320	0	0	3	0	0	1	4	8	0	0	0	95	0	103	0	12	12
14BU321	1	0	0	0	0	0	1	1	0	0	0	5	0	6	0	0	0
14BU322	1	1	1	0	3	0	6	3	0	0	0	90	0	93	0	12	12
14BU323	0	0	0	0	0	1	1	0	0	0	0	25	0	25	0	5	5
X-02	0	0	2	0	0	0	2	0	0	0	0	1	0	1	0	0	0
X-03	15	0	3	0	0	0	18	0	0	0	0	0	0	0	0	0	0
X-04	3	0	2	1	0	2	8	0	1	5	7	6	15	34	33	118	151
X-11	0	0	2	0	0	1	3	1	0	0	0	3	0	4	0	0	0
X-14	0	8	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0
X-20	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
X-21	0	0	1	0	0	0	1	0	1	0	0	0	0	1	0	0	0

BF=biface, PT=point, SC=scraper, GR=graver, RT=retouched piece, UT=utilized piece, C=core, CT=core trimming element, 1st=primary flake, 2nd=secondary flake, 3rd=tertiary flake, BFT=bifacial thinning flake, CH=chip, CK=chunk.

Table V. Other Artifacts Collected from Sites in the Study Area

Site	Ceramics: MT	GT	GR	SH	TOT	Daub	Historic Materials: MB	BG	BR	TOT
14BU2	0	0	0	0	0	0	0	0	0	0
14BU314	0	0	0	0	0	0	0	0	0	0
14BU315	0	0	0	0	0	0	0	0	0	0
14BU316	0	0	0	0	0	0	0	0	0	0
14BU317	0	0	0	0	0	0	0	0	0	0
14BU318	0	0	0	0	0	0	2	0	0	2
14BU319	0	0	0	0	0	0	0	0	0	0
14BU320	0	4	0	0	4	41	0	0	0	0
14BU321	0	0	0	0	0	0	0	0	0	0
14BU322	0	0	0	0	0	0	0	0	0	0
14BU323	0	0	0	0	0	0	0	0	0	0
X-02	0	0	0	0	0	0	0	0	0	0
X-03	0	0	0	0	0	0	0	0	0	0
X-04	1	0	0	0	0	0	0	0	6	6
X-07	0	0	0	0	0	0	0	0	0	0
X-11	0	0	0	0	0	0	0	1	0	1
X-12	0	0	0	0	0	0	0	0	0	0
X-14	0	0	4	2	6	0	0	0	0	0
X-20	0	0	0	0	0	0	0	0	0	0
X-21	0	0	0	0	0	0	0	0	0	0

MT=metate fragment, GT=grit-tempered, GR=grog-tempered, SH=shell tempered, MB=musket ball, BG=bottle glass, BR=brick

APPENDIX C

PHOTO ESSAY OF HISTORIC HOUSES IN THE STUDY AREA

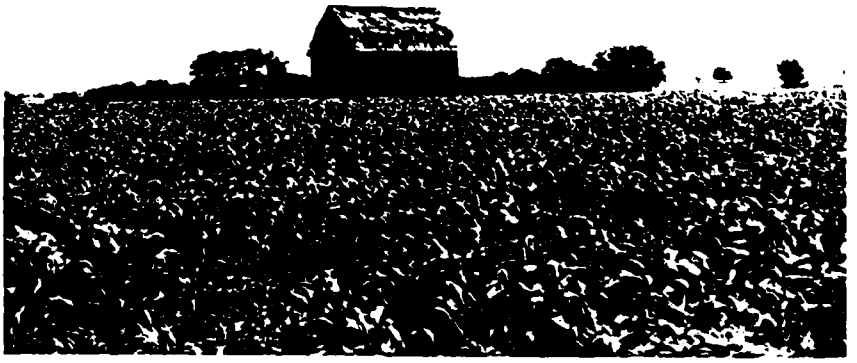

Plate 27. Barn located along old Roadway in Section 7, T28S, R5E

Plate 28. House located in the NE ¼ of Section 7, T28S, R6E.

Plate 29. House located in the NE/4 of Section 28, T28S, R6E.

Plate 30. House located in the SW/4 of Section 8, T28S, R6E.

Plate 31. House located in the NW/4 of Section 8, T28S, R5E.

Plate 32. Stone house located in the SW/4, SW/4, NW/4 of Section 17, T28S, R5E.